THE

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or,

Universal Dictionary

of

ARTS, SCIENCES, AND LITERATURE.

VOL. XVI.
THE CYCLOPAEDIA;

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY


WITH THE ASSISTANCE OF

EMINENT PROFESSIONAL GENTLEMEN.

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BY THE MOST DISTINGUISHED ARTISTS.

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GENERATION. 

GENERATION is that function of the animal economy by which the species is perpetuated. Inanimate matter and unorganized bodies are subject to no alterations, and would never change their condition, did not external forces destroy or modify them. On the contrary, organized bodies, very different from these inert masses, are active media of new combinations and changes; they undergo alterations, and are even destroyed by the exercise of their own powers, the entire effusion of which delivers up their spoils to the grand circle of changes, which organized matter is constantly undergoing. Although some of these bodies may last for a century, while the greater number live only for a few years, days, or even hours, this unequal duration, these moments or ages of existence, are nothing with respect to nature, and the death which the allots to man, to the plant or the insect, is not the least necessary and certain. But, if individuals are sacrificed and perished, the species survive and are immortal; by a constant and general law, animated bodies never die altogether, but are renewed and perpetuated by various modes of re-production. Some terminate their vital course while others are beginning it; and never, says Lucretius, does morning or night visit the globe, without having funeral lamentations round a bier, and the plaintive cries of an infant in the cradle. There is a constant alteration of deaths and births, of losses and reparations; and the torch of life is rapidly transmitted in the series of succeeding generations; "quasi currentes vital lampades tradunt." At a certain point of elevation in the scale of animal existence, this object is accomplished by a double series of organs, executing very different functions; and reproduction is effected by a true proof of generation, under the influence of that physical feeling, the Venus, whose universal empire and irresistible attractions are so beautifully delineated by the Roman poet.

"Aeneadum genetrix, hominum divumque voluptas,
Alma Venus! ece subter habentia signa
Que mare navigerum, que terras frugi ferenteis
Concelebras; per Te quoniam genus omne animantium
Concipitur, viuitque exortum lumina solis;
Te, Dea, te fugiant venti, te nubila ecehi,
Adventumque tuum: tibi amitas dedita tellus
Submitit flores; tibi ridens squora ponti,
Phacatumque nitet diffuso lumine eculum.
Nam, simul ac species patetifica eft verna diei,
Et referata viget genetabilia auris Funibii;
Aeris primum volueres, te, Diva, tuamque
Significant initiun, percolis corda tua vi.
Inde ferre pecudes perfaliant pabula beta,
Et rapidos transcant annes; ista, capta lepore,
Ilecebrifique tuis omnis natura animantium
Te sequitur cupide, quo quamque inducere pergis.
Dumique, per maria, ac montes, fluviique rapaces,
Frondiferaque domos avium, camposque virentes,
Omnia incidunt blandum per pectora amorem.
Efficiat, ut cupide generantia fella propagat.

Generation is the greatest mystery presented to our view in the economy of living bodies; and its real nature is still involved in the most complete obscurity. Hitherto no observation authorizes us to admit the simultaneous formation of a living body in all its parts; that is to say, by the union of particles suddenly brought together. The comparison of generation with crystallization is supported by no just analogy: crystals are made up of homogeneous particles, attracting each other indifferently, and agglomerated by their faces,
The origin of the gernis, and the mode of their existence in the female; whether they are originally formed in all their parts in each individual by any vital process, or are all pre-existing, being inclosed in each other, or whether they are differentiated through the body, and require a concourse of circumstances to bring them into a situation favourable for their development, are questions, which it is utterly impossible for us to decide in the present state of our knowledge.

The chief points have for a long time been agitated by phylogenists; but the discussion seems now to be abandoned by universal consent.

The combination of the sexes, and the mode of fertilization, are subjects to great variety. In some instances, the two sexes are united in the same individual, and fertilization is accomplished without any extraneous aid; such are the hermaphrodite and monoeocious plants, the asperatus mollusca, and the echinodermous animals. In others, each individual possesses both sexes, but requires the assistance of another, which it fertilizes, and by which it is fertilized. This is the case with the galatopodous mollusca, and with several worms. There are distinct individuals, male and female, in other classes; as, for instance, in the dioecious plants, in all animals, which have a vertebral column, in the cephalopodous and some galatopodous mollusca, in some worms, in the crustacea, and in insects; in short, in the far largest portion of the animal kingdom.

Fertilization is accomplished in plants by means of a liquor contained in small capsules, which resembles a fine powder in appearance, lodge on the female organs, and, building, deposits their contents. In animals, the liquor is always applied immediately upon or about the germs; and in many cases it is not brought in contact with the ovum, until they have been laid, as in the bony and oviscaporous fishes, and the cephalopodous mollusca; here the males and females have no commerce. Sometimes, as in the frog and toad, copulation is necessary in order to determine the discharge of the ovum and semen, but fertilization is still performed out of the body. Lastly, in the great majority of instances, the seminal liquor, introduced by the male into the body of the female, fertilizes the ovum before they are laid. This is the case in the mammalia, birds, moll reptiles, and some fishes, in the hermaphrodite galatopodous mollusca, in the crustacea, and insects. The union of the two sexes, or the act by which this is accomplished, is called copulation. In all the last-mentioned orders ovum may be discharged without previous copulation, as in the preceding ones. But they receive no further development; nor can they be fertilized when thus voided. The effect of a single copulation varies in its degree; it usually fertilizes one generation only, and produces one pregnancy; but sometimes, as in poultry, several eggs are fertilized, and afterwards discharged successively; still, however, they only form one generation. In a very few instances, one act of copulation fertilizes several generations, which can propagate their species without the aid of the male. In the plant-louse (aphis) the species has been continued through eight generations from one copulation; and in some monoeocious, through twelve or fifteen.

When the germ is detached from the ovum, its means of existence may be more or less complete. In most animals it is accompanied by an organized mass, to which it is connected by means of vessels. The absorption of this sers for its nutrition and development, until the period of its independent existence. It derives nothing therefore from the body of the mother, from which it is separated by coverings, varying in number and solidity. The germ, together with its malls of nourishment, and the surrounding membranes, constitutes an egg, or ovum; and the animals, which produce their young
young in this state, are denominated oviforms. In most of these the germ contained in the egg is not developed, or hatched, until that part has quitted the body of the mother, or has been laid; whether it be necessary that it should be afterwards fecundated, as in many fishes, or that it requires only the application of artificial heat for its incubation, as in birds; or that the natural heat of the climate is sufficient, as in reptiles, insects, &c. These are strictly viviparous animals.

The ovum, after being fecundated, and detached from the ovarium, remains in some animals within the body of the mother, until the contained germ be developed and hatched. There are fowl viviparous, or ovoviviparous. The viper and some fishes afford instances of this process.

The mammalia alone are truly viviparous animals. Their germ poissesses no provision of nourishment, but grows by what it derives from the juices of the mother. For this purpose it is attached to the internal surface of the uterus, and sometimes by accident to other parts, by a kind of root, or infinite ramifications of vessels, called a placenta. It is not therefore completely separated from the mother by its coverings; and it does not come into the world until it can enjoy an independent organic existence. The mammalia cannot therefore be said to poissess an ovum, in the sense that we have assigned to that term.

According to this sketch of the subject, generation may be said to consist of four functions, differing in their importance, and in the number of animals, to which they belong, viz. 1st. The production of the germ, which is a constant circumstance; 2dly. Fecundation, which belongs only to those animals where there is a distinction of sexes; 3dly. Copulation, which is confined to those kinds of sexual generation in which fecundation is accomplished within the body; lastly, Utero-genitation, which belongs exclusively to viviparous generation. The generative organs may be most naturally arranged according to this distribution of the partial functions, which they execute. The simple production of a germ, or oovoviviparous generation, may be accomplished at any point of the body, and has, therefore, no peculiar organs.

Sexual generation demands an organ for the production of germs, and another for that of the fecundating liquor. Modes of union are necessary when copulation takes place; and fertilization requires a receptacle adapted to the abode of the germ. Thus we have preparatory and preparing organs; instruments of copulation; and organs of education. Those of the two first classes are divided into male and female; the last belong to the latter sex only. The preparatory and preparing organs of the males secrete the semen, and the other fluids which are to be mingled with it, and retain these secretions. They confine, in their most complicated form, 1st. Of the vesicles, which prepare the femoral fluid, and conduct it, either into a particular resevoir, or into a canal, from which it is conveyed out of the body, or into a cleaan, from which it is in like manner ejected; 2dly. Of the vesiculae seminales, supposed to be resevoirs for the semen; 3dly. Of the prostatic glands; and, 4thly. Of Cooper’s glands, which secrete a pecurial fluid, mixed with the semen at the time of coition. The vesicles are highest in the last class of the animal kingdom, where generation is performed by a female division of the animals or by florids. They exist in all the classes of vertebral animals; and of the invertebrate division, in the mollusca, crustacea, insects, and most vermes. Their number, structure, &c. differ very much in these various classes. The vesicle, prolate, and Cooper’s glands, being less essential in their functions, are much less generally found, and are chiefly confined to the first classes of the animal kingdom. The preparatory female organs serve the purpose of developing and preparing the germ. Their existence is as general as that of the parts just mentioned; but they are much more simple in the first class of the animal kingdom. They consist of two bodies similar in form, size, and structure, and named by modern physiologists ovaries, in order to express more accurately, than by their old name of vescicles, the function to which they are destined. In fact, if their structure, considered simply in man, and most of the mammalia, leave any doubt concerning their office, their nature is so evident in the other classes, that their function cannot fail to be recognized. In all the classes which succeed the mammalia, the ovary or ovaries serve evidently for the production and preservation of the germ or ovum, which are formed in these bodies previously to the approaches of the male. Analogy leads us to conclude that the same circumstance holds good in the mammalia; and this conclusion is one of the most important results from the study of comparative anatomy and physiology.

The organs of copulation, in the male sex, consist of one or more projecting bodies, called penes, generally perforated by a canal, named the urethra, capable of being introduced into the female organs, in order to convey to them the fecundating liquor, or for the simple purpose of producing an irritation necessary for conception; or they are supernumerary members, enabling the male to grasp and hold the female. In the latter sex, the copulating organs consist of canals, particularly designed to receive the male penis, or give passage to the products of conception; or of cavities, which serve also for other purposes, but which, at the time of copulation, receive the penis, and transmit the fecundating liquor to the educating organs.

The educating organs receive the germ or ovum, after its detachment, from the ovarium, retain it for a shorter or a longer period of time, contribute to it a more or less direct manner to its growth, and convey it out of the body, or they furnish it no moisture, and let it be carried to a temporary lodging. They are, therefore, divided into external and internal parts. The latter may be again distinguished into two kinds. The first of these are simple canals, through which the germ or ovum is to pass, either in order to be conveyed out of the body (as in the egg), or to be transmitted into the parts of the second description. The latter are very dilatable bags, to the partes of which the germ is attached by means of vessels conveying the materials of its nutrition, and preserving it in this way until it has acquired a certain degree of growth. Organs of the first kind are formed in the four classes of vertebral animals; and are called follicular tubes, in the mammalia, ovulatrices, in the birds, reptiles, and fishes. Parts of the latter description belong to the mammalia only, and are the uterus. The external educating organs are, in the mammalia, the mammary glands secreting the milk by which the young are nourished; or receptacles, in which they are retained for a time, in a few genera. One kind of reptiles only poissesses analogous pouches.

To fill up the outline which we have presented to our readers in the preceding sketch, would require a detailed description of organs varying almost infinitely in form and structure in the different classes of organized bodies. These details will be found in the proper articles of the Cyclopaedia, relating to vegetable and comparative anatomy; this general view has been thought sufficient, as introductory and explanatory. The remainder of this article will be devoted to the anatomy and physiology of the generative organs in the human subject. The growth and development of the ovum in the uterus have been considered under the article EMBRYO, and the anatomy of the mammary gland will be found under BREAST.

The preceding account will show what various methods are employed by nature for the perpetuation of the races of orga-
organized beings; this seems to have been a very leading object, and one accordingly, in which the has developed all the fertility of her sources. Searcely can such diversified phenomena be reduced, by artificial classifications, to any common and constituent laws: new facts specifically modify or overturn the previous generalizations; and imagination can scarcely conceive any possible forms of propagation which observation does not soon realize. The generative functions are particularly attended to by those who are employed in delineating the manners of animals. They will probably find that the propinquitities and habits of each are intimately connected with the mode of propagation; and that the character of its wants, pleasures, and labours, its sociability and perfection, and the extent or importance of its relations either to other species or to the various external bodies or agents, particularly depend on the circumstances or conditions to which its reproduction is subjected, and on the disposition of the organs employed for this purpose. This is certainly very much the case with men, which is the object of our present investigation.

Man belongs to one of those classes of the more complicated and perfect animals, where propagation is effected by the concurrence of two beings, whose organization, possessing most circumstances in common, is distinguished by certain particular traits. He quits the womb of his mother with organs capable of fulfilling the impressions of the atmosphere, and of affording food to his own substance: he can already live by his own independent powers. He is not destined to remain, like the oviparous animal, included in a foreign envelop, and to continue for an indeterminate length of time in a state of inaction which hardly differs from non-existence: he does not wait until creative warmth bellows on him motion and life, amid the nutritive fluids prepared beforehand by nature, like those in which the embryo of the serpent, the tortoise, or the bird swims for a long time as an inheriting point. The human fetus has been supported in the uterus by fluids animalized in the vessels of the mother: it subsists, immediately after birth, on milk, prepared in organs yet apart for that office. The duration of gestation, that of infancy, during which the aid of the parents is indispensable, and the epoch of puberty, or the moment at which the generative faculty is manifestly by feasible signs, differ greatly in the different species of animals; these circumstances are not connected together by uniform or constant relations.

Man, like all the more perfect animals, is not born with the power of reproducing the species. The organs, which are at a future period to exercise this function, are now completely inactive, and the properties which fulfill this operation do not exist. The time of puberty — the epoch at which the frame and powers of the being receive their full development, is also the period at which the generative organs, recovered from their lethargy, assume an active state, and become capable of exercising their functions. The duration of infancy is longer, and the age of puberty is later in man than in any animals: although the term of gestation is shorter than in some other species. These circumstances must have a very marked influence on the wants, the faculties, and the habits of the human race.

The characters of the generative functions partake of those which belong to the animal and organic lives. Thus, on one side, all that precedes the union of the sexes, all the impressions made on one by the charms which nature has bestowed on the other, belong to the senses; this very union is an act of the external life, to which animals are impelled by instinct, over which reason presides to a certain degree in man. The influence of habit is also perceived here; but instead of blunting the enjoyment, it renders it rather more acute, and often gives rise to factious wants. On the other hand, the secretion of the fluid, by the emission of which man contributes to the reproductive processes, the mysterious work of conception, the development of the new being, &c. all belong to the organic life.

Sexual Distinctions.—Some ancient philosophers have held on this subject opinions very injurious to the fair sex, and indeed so manifestly whimsical and ridiculous, that a simple statement of them will shew their absurdity. Woman, in the opinion of Aristotle, is an imperfect man, an ill-formed and imbecile individual: while man is characterized by the attributes of strength and power. Galen goes even further, and confounding the sexes in those very parts, where their distinguishing characters are the most unequivocally marked, admits no other differences between the male and female generative organs than such as may be deduced from development and formation. He does not regard even the addition of the uterus in the female as an objection to this opinion, but, bending nature to his hypothesis, he represents this organ as being turned inside outwards in man to envelop the glands in which the seminal fluid is elaborated. This strange paradox has been adopted by numerous writers, and is hardly yet completely abandoned. Daubenton calls the clitoris a penis in miniature; Buffon turns the ovaries into testicles, and endeavours to prove that the addition of the uterus alone constitutes any essential distinction between the male and female parts.

Some resemblance in the unimportant points of form and arrangement gave rise to these unfounded analogies: pride and sexual prejudices, joined to the results of superficial observation, seem to have so far misled true philosophers, whose strange opinions we have just alluded to, as to make them discover, in one of the first productions of nature, a feeble sketch, and a timid production. Woman has appeared to them as a degradation and imperfect copy of the constitution of man, while, in fact, she is the most essential part of the species, as contributing by far the greatest share to the business of reproduction. A more accurate examination will destroy these haphazard analogies, and prove that man and woman do not differ in the relations of more or less, that the structure and functions of their generative organs are different in the kind; that their whole constitution has in each its peculiar type, the distinctive traits of which offer to us a long chain of physical and moral effects more or less immediately dependent on the functions of the organs concerned in the business of generation.

The characters of sex do not therefore shew themselves in any single point; it is not merely a particular organic apparatus, nor those external forms which delight us, that constitute woman; and if she is principally characterized in some parts, where the sexual physiognomy is the most distinctly expressed, if the superficial traits, and the sweetly rounded contours, which constitute her charms, form her most agreeable distinction, she is woman in the eyes of the naturalist and physician, in all her modes of existence, in her moral affections as well as in her physical system, in her enjoyments and pains; in a word, all parts of her existence bear the character of sex, and present a series of contrasts and oppositions with the corresponding points in man.

It is however only at the epoch of puberty, at that period of life called by Buffon "le printemps de la nature, la saison des plaisirs," that the appearance of all the sexual traits is exhibited to our observation; and that man and woman, attuned to each other with different and proportionally as they differ become connected by various relations, which enlarge and exalt the excellence hitherto personal, solitary and isolated. Woman may be distinguished from man by general and particular differences: the latter are so decided as to be easily discernible at all times, while the former, which are our present obj-
GENERATION.

In running through a more detailed sketch of the differences observable in the two sexes, we find them differing in the first place in stature, and in the size and proportions of parts. The height is less in the female, by about one-sixth. The middle of the body in man is at the separation of the lower limbs at the pubis: in woman it is higher, and hence the lower limbs are shorter, while the humerus region is longer. This gives to the female sex in general, and to the Americans and Negresses in particular, that elegant slenderness which distinguishes them. The arm or leg of a woman could be immediately distinguished from those of a man: the form of these parts is much more delicate, and less marked by decided prominences. The bust is not so broad, but more rounded, and particularly distinguished by the size and elegant formation of the breast, which is commonly but little developed in man, where its greater development would be regarded as a deformity. The thighs are much larger, more rounded, and further apart; they approach each other below, so that the knees are slightly turned in. The latter circumstance is seen in the Venus, and the whole formation of these parts is attended with advantages in gait and parturition, although the peculiaritiy in question is not seen in these females which in common opinion are the most formed. The convexities described by the lower limbs at their upper part, and uniting them by a closer, happily rounded form with the trunk, have a very obvious peculiarity of character in the softer sex. They are more prominent, and approach in their contour more to the semispherical form. All other parts of the lower limbs are distinguished by their small round outlines. The foot is smaller, and the base of support for the body is proportionally more narrow. The leg gradually diminishes from above downwards, instead of swelling out abruptly at the calf. The outlines of the upper limbs are equally flowing and soft; thus the arm of woman is fatter and more rounded; the whole upper extremity corresponds in its comparative shortness and smallness to the general difference in stature; and is terminated by a small hand, and short, delicate and flexible fingers.

We may observe further that the head is smaller, the face shorter, and the neck longer in woman. The cheek is not so long, but deeper; the abdomen more prominent and rounded; the shoulders are carried more backwards, and stand out less from the trunk. Hence the breadth of this part is much less considerable than in man, where the shoulders are more fully developed and more widely set off, and conform to their comparatively greater size, a very impressive feature of the superior strength, which is the attribute of the male sex. In the female trunk, on the contrary, the breadth part is below: the pelvis, holding the organs of generation, being principally concerned in the functions of utero-gestation and parturition, being, in short, the seat of those attributes which especially distinguish the female, is much more spacious than in the male. Hence the superior breadth of the female hips: hence the opposite character of the trunk in the two sexes, in respect to size. The trunk of the female is a pyramid, with the breadth part below; that of the male is just the reverse. Camper has shown, that if the body of a well-formed man be delineated on an elliptical area, the shoulders pass out of the ellipse, while the pelvis falls within it; on the contrary, that the hips exceed, and the shoulders fall within the line in woman. (Memoire sur le beau Physique.)

In those specimens of ancient art, which may be regarded as models of the most characteristic formation, the difference of breadth in these parts amounts to one-third: the shoulders being so much broader in the male, and the hips in the female. The greater breadth of the pelvis gives a broader base.
balse of support to the female trunk; and, as it throws the thigh-bones further apart at their upper ends, produces the increased widening of the hips. Hence in progressions the centre of gravity is more sufficiently changed at each step; and there is a perceptible rolling of the pelvis, which characterizes the female gait. The inconveniences of this arrangement counterbalance the advantages which the broader base of support might otherwise have bestowed on the female organization; and the latter is, in truth, an imaginary superiority, since the feet, which are always small in women, offer ultimately a narrow surface for the body to rest on.

The various pieces of the skeleton, by their respective dispositions and junctions, determine the essential form of the body, its position and attitudes, and the extent and variety of its motions. The characters of the general form, which we have already considered, are therefore to be retraced in the bones; and in this point of view a parallel of the male and female organization leads to very important results. It is difficult to meet with a well-formed female skeleton, where the structure can exhibit or recall the leading traits of the female form. After much trouble and observation, Sommerring met with a specimen of what he considered the best and most natural form in a young girl of Mentsy, whose form had not been impaired by absurd modes of dressing, and who had been successfully delivered a short time before her death. A beautiful plate of this skeleton, with its description, is exhibited in his "Tabulae sex dulcitatem, juncta descriptione," folio, 1797. The female skeleton, on the whole, is smaller in all its dimensions, and more slender than the male. The individual bones have fewer inequalities, their prominences are less strongly marked, the grooves or impressions more superficial, all the cavities less deeply hollowed out; hence the surface seems more finely raised, and is distinguished by its smoothness. They are often actually softer, and have on the whole a peculiarly feminine character, which is not confined to the cavities, but is diffused through the entire structure.

The head, with the teeth, bears a greater ratio to the weight of the skeleton, on account of the individual bones being in general more slender: the proportions are 1:6 in the female, 1:8 or 1:10 in the male. The cranium is larger in proportion to the face. The thorax is shorter, more convex in front, and more distant from the pelvis, the space between the last rib and the crista ili being greater. It is less prominent in front; so that while this part of the skeleton is the lowest in the erect or supine position of the male, the symphyses pubis does the same in the female. The humps are longer, and the angle between them and the facium more acute. The disposition of the pelvis is particularly characteristic, as being so immediately connected with the sexual functions. It is larger in all its dimensions. The facium is turned more backwards, is broader, and more concave; the osa coccygis, more moveable and flender, project less into the cavity of the pelvis. The hip-bones (osa innominata) are broader, smoother, and expanded further in the lateral direction: hence their cribs and tuberosities are more diffuse, and hence the space between the osa pubis is greater. The angle formed between the rami and symphyses pubis is larger than between the two bones of the pubes is acute in man, while it is of 80 or 90 degrees in woman; and approaches more nearly to the form of an arch. That the sexual functions are favoured by all these circumstances is very evident; but the advocates of final causes point out more particularly the reason for the wider space under the osa pubis: "Ad virum admittendum intercavernae majores cum infra internum vulnus pubis." (Albinus de sexu, p. 475.) The tuberosities of the ischia are more distant, larger and smoother. The clavicles are less curved, and the shoulder joints are less confined. The acetabula are further apart, and the thigh-bones more oblique in their position: the latter are also more curved forward, and have longer internal condyles.

The muscles of the female are more slender and delicate; they are, in fact, less dense, softer and more pliable. These organs are less prominent, and their feelings, partaking of the general softness of the female constitution, have not that character of vigour which their rough prominences and strongly marked intertissues impress on the frame of a muscular man, in whom the exterior traits of sex have not been destroyed by effeminate manners or sedentary habits. The cellular and adipose tissue is more abundant in the female; and this, joined to the smaller prominence of the muscular biceps, gives to the limbs that soft roundness and delicate contour which characterize female beauty, as expressed in the most celebrated productions of great artists.

The differences just described, the comparative weaknesses of the muscles, the elegance and beauty of the external forms, belong to the very nature of woman. Education and habits may add to these characters; may increase the delicacy of organization; but their influence is not sufficiently powerful to induce us to overlook the existence of a radical innate difference in the physical structure of the sexes, occurring in all ages and amongst every people. That such differences of organization will produce corresponding varieties of function may be readily allowed: but our facts are not quite so indisputable on this point. We could undoubtedly point out many peculiarities in the sensibilities of women, taking the term in its most extensive sense, in their perceptions, their mental operations, and the reactions of the nervous system on the rest of the frame. We could trace many circumstances to the influence of the generative organs, and particularly of the uterus. But the influence of education, habits and customs, is so extensive, that it is difficult to distinguish between the results of these causes, and of the supposed original distinctions in organization.

The reader may refer to this subject to the Histoire naturelle de la Femme, by Moravus, tome 1, p. 112, &c.

We cannot draw any very strong line of distinction between the sexes in the vital and natural functions. We may apply, indeed, to this subject, the philosophical remark of Buffon concerning animals; viz., that they differ from each other more strikingly in proportion as we compare them together in superficial points, which do not affect the nature of their existence so much as its exterior development. Yet the characters of sex are so deeply imprinted, that we find traces of them even in these functions, when submitted to a rigorous examination. The pulse, ceteris paribus, is more frequent; the lungs are smaller, and the chest narrower. The appetite is less; the body grows more rapidly, and the periods of dition, puberty, and adult nature are more early. See for more detailed observation on this head, the work above quoted.

The voice is marked by very characteristic distinctions in the two sexes. In man it is strong, deep, less soft and flexible. In the female it is sharper, and the organs are more flexible, so that articulate sounds can be performed more rapidly. It has also a peculiar quality or tone, which, in many infinances, constitutes an irrepressible attractive charm. "Of all acute voices," says Roufian, "it must be allowed, in spite of the prejudices entertained by the Italians in favour of the castrati, that none are equal to those of women, either in the extent or beauty of the tone." The anatomist, perhaps, will attempt to explain these circumstances by observing, that the glottis is not enlarged at the age of puberty in females, as it is in males; that the larynx is considerably smaller; that the tongue, the muscles, and the organs of speech being
The differences which we have enumerated are not very distinctly perceivable, until the two sexes have reached the epochs of their respective perfect development. They are concealed, in the early periods of infancy, under external forms which are nearly the same in both sexes. It is true, indeed, that we can distinguish a male from a female embryo (see Examine); but the leading sexual distinctions are by no means fully developed until the age we have mentioned. The muscles have not yet produced any remarkable change in the direction of the bones; the glandular and fibrous parts hardly differ either in form or volume; and the skeletons can scarcely be distinguished by the breadth of the hips and pelvis. The like confusion prevails in the moral dispositions of the two sexes: boys are not distinguished in this respect from girls. The appetites, ideas, and passions of both are the same. We cannot at present, nor perhaps shall we ever be able to determine, by what particular action the organs of generation influence the other parts of the body, direct their operations, and modify the character and order of the phenomena relating to them. The fact, however, is evident; and the influence is incontestable. For, when the natural development or actions of the generative organs is impeded, the secondary characters, by which the sexes are distinguished, do not take place.

To illustrate this subject, let us observe, that the several differences of animals may be divided into two classes; the former include the differences in the parts of generation themselves, which are originally formed differently, and belong equally to both sexes; the latter are all the other variations depending on these, not taking place until the parts of the first class are coming into use, and being principally, though not entirely, in the male. One of the most remarkable secondary characters in animals, generally speaking, is the superior strength of make in the male; and this strength is generally directed particularly to the organs employed in fighting. Hence it is especially noticeable in the animals whose females are of a peaceable nature; e.g., the leg of the cock and neck of the bull. But in carnivorous animals, where strength is required by both sexes to kill the prey, the differences in the form of the male and female are not so striking, yet the sexes are still distinguished by some differences in their external covering, as the male lion by his mane, and the cock and hen of many birds by the plumage. The general strength of make, the hairy covering, and the voice distinguishing the male from the female of the human species. Now in all animals, which are not of any distinct sex, no such alteration takes place in the form at the time of puberty. Thus, the free martin, which possesses a mixture of the generative organs of both sexes, does not exhibit in form a resemblance of either the cow or bull. It is very much like the ox or spayed heifer, being considerably larger than either the bull or the cow, and having horns very similar to those of the ox. The voice is similar to that of the ox, and more like that of the cow than of the bull. The billy, like that of the ox or spayed heifer, is generally much fatter in the body, than that of either the bull or cow; it is supposed to exceed that of the ox and heifer in delicacy of flavour, and bears a higher price at market. (See "Account of the Free Martin" in Mr. Hunter's observations on the animal economy, p. 55.) A similar effect is produced, when the sexual parts are removed after birth; the castrated male and the spayed female have both the same common properties, and are very much like the free martin; the artificial removal of the generative organs preventing the occurrence of those changes, which would naturally have occurred at the time of puberty. Thus, by depriving either sex of the true parts of generation, they
they seem to approach each other in appearances, and acquire a resemblance to the hermaphrodite. Reflecting the changes, which occur at puberty, Mr. Hunter says, "It is evidently the male, which at this time in such respects recedes from the female; every female being at the age of maturity more like the young of the same species than the male is observed to be; and if the male is deprived of his testicles when young, he retains more of the original youthful form, and therefore more resembles the female. From hence it might be supposed, that the female character contains more truly the specific properties of the animal than the male; but the character of every animal is that which is marked by the properties common to both sexes, which are found in a natural hermaphrodite, as in a stall, or in animals of neither sex, as the castrated male or spayed female. But, where the sexes are separate, and the animals have two characters; the one cannot more than the other be called the true; as the real distinguishing marks of each particular species, as has been mentioned above, are those common to both sexes; and which are likewise in the unnatural hermaphrodite. That these properties give the distinct character of such animals is evident, for the castrated male and spayed female have both the same common properties; and when I treated of the free stall, which is a monstrous hermaphrodite, I observed that it was more like the ox than the cow or bull; so that the marks characteristic of the species, which are found in the animal of a double sex, are imitated by depriving the individual of certain sexual parts, in consequence of which it retains only the true properties of the species." (See "Account of an extraordinary Phenomen," in Mr. Hunter's observations on the animal economy, p. 75.)

The influence of the generative organs in the development of the body at puberty, and in the modifications which constitute the sexual character, is clearly evinced in the stall, whose amours are conducted in so splendid a style, and evince so remarkable an exuberance of vitality. When he is deprived, at an early age, of the sexual attributes, none of the vigour of the rutting season is displayed; the muscular flesh is softer, and the horns are either arrested in their growth entirely, or are imperfectly formed. Ruffled castrated a very young stall, and no horns appeared; he operated on an older one, and the horn was partially developed. When he removed one testis at a more advanced age, the opposite horn was the most completely formed; the removal of both glands from two adult stags did not prevent the appearance of the horns; but they were shorter, and neither the investing membrane, nor the horn itself, were afterwards separated. (On the Economy of Nature in glandular Diseases.)

Facts very analogous to these may be observed in the human subject. An imperfect original formation of the sexual organs, or the removal of some of them modifies the whole character of the individual, changes the physical constitution in a very remarkable manner, and influences in a no less striking degree the moral habits and dispositions. Observers in all ages have remarked, that mutilated or imperfect animals poise asemblage of peculiar characters, all of which have not a very direct relation to the functions of the generative organs. Not only are the sexual defects entirely lost in these degraded individuals, but the whole of their organization is affected in a very singular way. The cellular texture becomes more abundant and lax, and is more loaded with fat; the muscles are weaker: the voice more acute: and the development of the beard is impeded. The change in the moral dispositions is not less worthy of attention. It was the opinion of the ancients, that masturbation degrades man, and brings animals to perfection; the truth is, that it equally degrades both, since it alters their nature.

But, by weakening an animal, it renders him more docile, and better suited to the purposes of man; by destroying the tie, which connects him the most powerfully to his species, it afflicts in developing those habits of obedience and attention, and those feelings of gratitude and attachment which make him so serviceable to us. A similar effect is produced in man; mutilation separates him in a manner from his species; and the fatal event, which deprives him of the most agreeable relations established by nature, between beings of the same kind, almost extinguishes in his breast the peculiar feelings of humanity.

In those young persons, to whom nature has denied either wholly or in part, the distinguishing powers of the male sex, puberty does not produce its ordinary effects. And moreover, at this time the bony and muscular organs are constantly assuming more and more of the external forms, and general character belonging to the female. These equivocal individuals have an acute voice, weak muscles, and laxity in the general organization. The pelvis, too, has that greater proportional breadth which characterizes this part in women. This circumstance, as well as the consequent breadth, and great roundness of the hips, may be particularly noticed in the castrate. The physical condition is generally accompanied in these individuals with a perfectly corresponding moral state. All these points are fully illustrated in the following account of a marine folder, aged 23, by Mr. Home, (Observations on Hermaphrodites, Philos. Transact. 1799.) "He had no beard; his breasts were fully as large as those of a woman at that age; he was inclined to be corpulent; his skin uncommonly soft for a man; his hands fat and short; his thighs and legs very much like those of a woman; the quantity of fat on the os pubis resembled the mons veneris; the penis was unusually small, as well as short, and not liable to erections; the testicles not larger in size than we commonly find them in the female flat; and he had never felt any passion for women. He was weak in his intellects, and his bodily strength." Mr. Home mentions, in the same place, two other still more striking examples. A woman had three children, of which the first and third were supposed to be hermaphrodites; the second was a perfect female. The eldest, when Mr. H. saw him, was thirteen years of age, "of a most uncommon bulk, which appeared to be almost wholly composed of fat; his body, round the waist, was equal to that of a fat man, and his thighs and legs in proportion; he was four feet high; his breasts as large as those of a fat woman; the mons veneris loaded with fat; no penis; a prepubescence of an inch long; and under it the meatus urinarius, but no vagina. There was an imperfect serotum, with a smooth surface, without a raphe in the middle, but in its place an indented line; it contained two testicles of the size they are met with in the fexitus. He was very dull and heavy, almost an idiot, but could walk and talk. The younger one was six years old, uncommonly fat, and large for his age; more an idiot than the other, not having sense enough to learn to walk, though his limbs were not defective. The external parts of generation differed in nothing from those just described, except in the prepuce being an inch long."

An interesting case is mentioned in the Mémoires de la Société médicale d'Émulation, t. 3, p. 253, which tends to confirm the preceding observations. A young man, aged 23, has no testes in the serotum, which is only indicated by a slight corrugation of the integuments; a very small penis, which never changes its size, and two folds of skin, extending from the latter organ to the anus, and very much resembling the female labia. His stature is below the middle size. The skin is soft, smooth, and entirely free from hair;
the place of the beard supplied by a slight down. The voice habitually hoarse. The muscles not well marked, and the pelvis and chest resembling those of the female. The intellectual faculties are very dull, and the sexual appetite entirely wanting.

The period, and the manner of maturition, have considerable influence on the effects of the procids. The complete removal of all the external organs is a much more decisive method of annihilating the propensities connected with them, than any partial amputation, or compreッション, or ligature of the genitourinary cords. The operation is also more effectual, when performed in early infancy, than after the period of puberty. Venereal desires have been known to habit in considerable force, and with the usual external signs, after the removal of the sexes in the adult. The moral effects of this mutilation have been strongly depicted by Cabaret.

"Eunuchs are the vilest class of the human species; cowardly and knavish because they are weak; vicious and malignant, because they are unfortunate. Their understanding shows the absence of those impressons, which give to the body so much activity, which infuse into it an extraordinary proportion of vital energy, which cherishes all the expansive and generous feelings of the soul, elevates and directs all the thoughts. Nature is almost the only very imposing exception to this rule; he is almost the only eunuch whose man appears with glory in the page of history. Solomon, one of the lieutenants of Belphagor, is another rare example; he exhibited great courage and talents in the war with the Vandals in Africa. How immoral then, how cruel and fatal to society, is the practice of thus degrading and corrupting at pleasure the human species!"

A curious case in the Philosophical Transactions for 1805, pt. 2, in which the ovaria were deficient, shows that such a deficiency occasioned the female to approach in some points to the male formation. The subject of this narrative died at the age of twenty-nine. "Having ceased to grow at ten years of age, she was in stature not more than four feet six inches high. Her breadth across the shoulders was as much as fourteen inches, but her pelvis (contrary to what is usually observed in the proportions of the female skeleton) measured only nine inches from the front across the ilium. Her breasts and nipples never enlarged more than in the male subject; she never menstruated; there was no appearance of hair on the pubes, nor were there any indications of puberty, either in mind or body, even at twenty-nine years of age!"

The removal of the ovaries has been most rarely practiced in the human subject; probably the only case in which it has ever been done is that recorded by Mr. Pot, where their bodies were contained in inguinal hernia. A healthy young woman, aged twenty-three, large breasted, stout, and menstruating regularly, had a painful tumour in each groin, near the abdominal muscles. The ovaria were removed from these tumours by a surgical operation. "She has enjoyed good health ever since, but is become thinner and more apparently muscular; her breasts, which were large, are gone; nor has she ever menstruated since the operation, which is now some years." (Pot's Works, vol. iv. p. 329.) The changes which took place in the latter case seem analogous to what has been observed in some birds. After they have done laying, hen pheasants have been observed to acquire the plumage of the cock in some instances. This has been noticed in wild individuals; but Mr. Harter had three opportunities of ascertaining the fact by his own examination. He further mentions a pheasant, which had produced chickens eight times, and which, after moulting at eleven years old, displayed the feathers peculiar to the other sex. The tail of the cock appeared at the same time. This was repeated for three years, and the furs of the cock appeared also in the third year. The animal never bred after this change of plumage. The same fact has been noticed in the duck, see Home on Hermaphrodism, in the Phil. Transact. 1759. "We may conclude," says Mr. Hunter, "that this change is merely in effect of age, and obtains to a certain degree in every class of animals. We find for things similar taking place even in the human species; for that increase of hair observable on the faces or many women in advanced life, is an approach towards the beard, which is one of the most distinguishing secondary properties of man. Thus we see the fures, which, at an early period, had little to ciftinnish them from each other, acquiring about the time of puberty, secondary properties, which clearly characterize the male and female; the male at this time receiving from the female, and assuming the secondary properties of his sex. The female, at a much later time of life, when the powers of propagation cease, loses many of her peculiar properties; and may be said, except from the mere structure of parts, to be of no sex; even exceeding, in some respects, the original character of the animal, and approaching in age, in many respects, to the male, or rather more properly towards the hermaphrodite." Observations on the Animal Economy, p. 80.

Nothing can be more absurd than to seek for any mechanical explanation of these accidental phenomena, or even of the more regular phenomena, of which they interrupt the course, at the same time that they elucidate the laws. They cannot freely be derived from the structure of the organs to which they belong, nor from the known nature of the quors secreted in these organs. But the consideration of some physiological circumstances, which are very simple in themselves, may enable us to escape from this dark abode of occult causes, to which the theories of the ancients were confined, and which have been little changed, except in name, by the moderns. The latter indeed, by substituting, for the opinions of the ancients, other more dogmatical explanations, have given rise to more important and dangerous errors: they have induced men's minds to the pernicious habit of attempting to determine the nature of causes, where we can only observe effects; and in determining these causes they have often perverted mere abstractions. In the first place, it is a certain fact, however it may be explained, that the muscular fibres are weaker, and the cellular tissue more abundant, in women than in men. Secondly, we cannot doubt that this difference is produced by the influence and influence of the uterus and ovaria; it takes place infallibly when these organs are originally well formed, and are developed in the natural order. This weakness of the muscles imparts an instinctive dislike for violent exercises; it inclines the individual to amusements, and, when the age admits of it, to sedentary occupations. The greater separation of the hips renders progression less easy in the female, on account of the more extensive change of the centre of gravity. The mode of life in the female is thus indicated a priori by a circumstance in their organization, which might be regarded as trivial, and which can hardly be distinctly observed at an early age. Again, the habitual tenes of weakneais inspires less confidence. Not pufhilling the means of acting on surrounding objects by direct force, woman seeks for more indirect methods; in proportion as she finds herself calculated to exit alone, does she attempt to attract the attention of others, and to fortify her own existence by that of those surrounding beings, whom she judges most able to protect her. These observations would be almost sufficient to explain the dispositions, tastes, and general habits of women. They will naturally prefer those employments which require delicate address rather than muscular force;
they will employ themselves on little objects; and their minds will consequently acquire acuteness and penetration rather than extent and depth. Thus, as they lead a sedentary life, to which the nature of their employments confines them as strongly as do the immediate propensities depending on their organization, we see in a manner a new physical and moral system developed in them. They perceive their own weakness; hence the necessity of pleasing: from the latter circumstance arises the continual observation of all that is pleasing around them, also of their disposition, their attentions, their manners, their grace, in a word, their equanimity, which, in the present system of society, must be regarded as the aftereffect or result of their good and bad qualities.

For reasons exactly contrary to those which have been just explained, they acquire the opposite original and characterizing propensities: hence they naturally contract opposite manners and habits. Full of the feeling of their growing strength, and of the wish to exercise it, repose is disagreeable and irksome to them: they want lively motion, and they indulge in it with imperfection. Thus, without entering into further details, we see that the bent of their ideas and the character of their passions are formed directly by their original dispositions, and the kind of amusements or occupations which determine them to prefer. Now, the passions and ideas of the grown man are only those of the child developed and completed by the maturity of the organs, and the personal experience of the individual. See Cabanis, R. sports du physique et moral de l'homme, memoire cinquieme.

But hitherto explains us how modifications of fo general a nature can depend on the conditions of certain peculiar organs. We must then attend a little higher, and require whether the remarkable influence exerted by the organs of generation can be at all elucidated by their structure, their functions, or their physiological relations to the other branches of the system. We see, in the first place, that parts supplied by nerves which come from different trunks, or are formed by different nerves united together, are either more sensible or more irritable, and almost always both at once. Nature seems to have placed the ganglia and plexuses in the neighborhood of the visceras, where the nervous influence must be the most considerable. The epicraniac and hypochondriac regions abound with them; consequently their sensibility is very acute, their sympathies very extensive, and the corresponding portions of the intestinal canal enjoy a degree of irritability hardly equalled by that of the heart. Now the nerves of the generative organs in both sexes, without being apparently very important by their size or number, come from various sources, are connected with those of all the abdominal visceras, and by them, or rather by the great sympathetic, which serves as a general medium of connection, with the most essential divisions of the nervous system.

Secondly, observation shows us that the nervous system (of which the original organization and mode of acting determine the general sensibility of all the organs taken together, and the particular sensibility of each considered separately) may in its turn be powerfully modified by the character of those functions, which perform the most important part in the animal economy; that is to say, in other words, by the habitual impressions conveyed to it from one of its most sensible extremities. The less of one sex does not produce merely an increase of energy or attention in those which remain, and which seem to redouble their efforts in order to supply its place; but it changes the manner in which the nervous system feels and reacts, and hence arise new habits evidently connected with the habitual impressions which these senses then begin to receive. The practice of medicine proves to us, by daily examples, that the affections of various organs have the most marked influence on the tastes, ideas, and passions. The moral dispositions are by no means the same in diseases of the chest, as in those of the spleen or liver. A greater or less propensity towards a particular train of ideas or feelings (as for instance towards those connected with religious belief) is experienced in particular states of languor than in others; and the greatest aptitude to those avocations, which demand either considerable strength and activity in the imagination, or long continued meditation, is often experienced in a state of disease caused by the deranged functions of some of the abdominal visceras. Thus, then, nothing is more conformable to the laws of the animal economy, than that organs, endowed with a singular degree of sensibility, should exercise a very extensive influence on the machine in general; and we perceive immediately that the present is one of the most remarkable phenomena referrible to these laws.

In the work last quoted, Cabanis endeavours to explain this subject further, by observing that those organs, which seem to be the principal seats (foyers) of the peculiar sensibility of the generative apparatus, viz. the ovaries and testicles, are of a glandular structure, that the various parts of the glandular system affect each other very powerfully; and that the condition of this system altogether has a most important influence on the state of the brain, augmenting or diminishing its energy. The latter circumstance will apply with so much the greater force to a cafe, where the glands are distinguished by their great sensibility.

Again, it has been alleged that the seminal fluid formed in these filaments, when absorbed and converted into the circulation, affects the general mass of blood. At all events the commencement of this secretion is marked by important changes in the voice, the muscular motions, and the phlegmatics, by the appearance of the beard, &c. And we have seen, that in animals, the development of particular parts is materially modified by the presence and action of the tube. That an analogous fluid forms in the ovaries, and either furnishes the materials of the embryo, or contributes to their formation, and that its absorption produces analogous effects in the female, to those which we observe in the male, is in truth a mere hypothesis. But the influence of the ovaries in the changes at the time of puberty, whether produced in this way or not, is incontestable. Lastly, in explaining the different influence of these parts in the two sexes, we must ascribe peculiar dispositions in the original formations of the nervous system, as well as in the cellular organ, the muscles, and sense. These must depend on those unknown circumstances which influence the formation, life, and development of the embryo; their explanation must be referred to that of the differences of sex, they must be regarded as fundamental, and be admitted as such, without attempting to trace them any higher.

Hermaphroditism. — Having compared together the two sexes, and mentioned the most remarkable circumstances which distinguish the organization of each, we have to examine further whether nature has in any instances united the attributes of the male and female in the same individuals, so as to form a true hermaphrodite. The resolution of this question, which is not to be considered as satisfying idle curiosity, is equally interesting to the naturalist and the philosopher, and may influence the decisions of judicial tribunals on the important questions of impotence and sterility. The German artists have endeavoured to combine the beauties and properties of the two sexes in the same subject, and have exerted the magic powers of their chisel on figures of hermaphrodites.
maphrodites. Among these ideal productions, we may mention two beautiful statues in a recumbent position in the Florentine gallery. A small hermaphrodite statue is seen in the villa Albani, a very fine one in the villa Borghese, and there is another in an obelisk at Florence, pointing out that it partakes of the two sexes. All these are males in the external appearance of their generative organs, females in the form of the breast, in the features, in the elegance of the figure, and in the softness of the contours. (Winckelmann, Histoire de l'Art, 446. tome 1. p. 364.) These monuments furnish no proof on the subject; they are to be regarded as creations of art, derived from the imagination of the sculptor, and not as the representatives of any real existence. Winckelmann himself, who, in other respects, believes in hermaphrodism, classes the chef-d'oeuvres we have just alluded to among the ideal productions. They exhibit an attempt to form a more perfect being, by uniting together the peculiar excellencies of the male and female, without attending very particularly to the genital organs. The word hermaphrodite then, as applied to these works of art, includes the notion of a very high degree of beauty and elegance, in which all that is most admirable in either sex is combined in one individual; and the works, in which such are represented, may be regarded as the inventions of the greatest masters. (See Caylus's Recueil d'Antiquités, tom 3.) The fabulous account of the transformation of Hermaphroditus and the nymph Salome into a most lovely being, combining the attraction and the powers of both sexes, may be regarded as an expression of the common opinions on the subject.

The vast multitude of observations and histories of hermaphrodites, recorded in various medical works, renders it necessary for us to classify them under certain heads. 18. The true hermaphrodite? There is much reason to believe, that no instance of an hermaphrodite, in the strict sense of the word, has ever occurred in the more perfect quadrupeds, or in the human species. For, when we consider the bones of the pelvis, to which the organs of generation are connected, it is difficult to conceive in what way the complete parts of the male and female could be placed, distinct from each other; and no instance of its having happened is to be found, in any record, which can be depended on. To constitute an hermaphrodite, in the sense we are now considering, it would be necessary that the male organs of copulation and impregnation, such as the testes and their ducts, the vesicle feminales, prostate, urethra, and penis, should exist in the same individual with the organs employed for the purposes of conception, of receiving, nourishing, and expelling the foetus, such as a well-formed vagina, clitoris, labia, Fallopian tubes. The difficulty, and even impossibility of such an union, has been already recognized by Haller and Priest. Medical authors have indeed related cases of women, who, after having many children, had impregnated other females; (see Mollerus, Traité de Hermaphroditique, cap. 2. : Blan- card, Collect. Medico-Phys. cont. 3. obv. 83.) but such narratives are too obviously fabulous to require serious refutation.

The nearest approach to such an occurrence, as we have just alluded to, consists in a partial mixture of the female and male organs. This has been observed, not very rarely, in some animals. Mr. Hunter has given several instances of it in cattle; and it has also been seen in the dog, the ase, and the goat. The individuals, in whom such appearances have been noticed, are so far from having had the properties of both sexes, that they were obviously incapable of executing any sexual function at all. Even in this restricted sense, we believe that no case has occurred in the human species, and that all the supposed hermaphrodites among men have been individuals with imperfect or monstrous formations of some parts. The case mentioned by Petir, in the Memoirs of the Academy of Sciences for 1752, as exhibiting a mixture of organs, was clearly a male: and that related by Maret in the Memoires de Dijon, t. 2. p. 157, belongs to the same class. The following case, related by Giraud of the Hotel Dieu, shews us how careful we should be in drawing conclusions from external appearances, and will convince us that no account of hermaphrodites can be received, except on the faith of description performed by experienced anatomists. The individual was essentially a male, and offered some appearances of the other sex, not from the addition of organs, but from an unnatural distribution of some parts of the male apparatus. He was received in society as a woman, and was connected by a voluntary affection with a man, who had for a long time performed the duties of a husband towards him. This singular character died in the Hotel Dieu. He exhibited, externally, an affinility of the male and female properties. The bust had a completely masculine appearance; the chin was covered with firm hair, very analogous to a beard; the neck was thick, the chest broad, the bosom slightly swoln, and the nipples exactly like those of a man. The lower half of the body presented a contrast to these characters. The soft and delicate contours of the lower limbs, the rounded hips, the broad pelvis, and the greater separation of the thighs, approximated decidedly to the female form. An imperforate penis, two testicles, and an appearance of vulva, were the external generative organs. The testes were well formed, the vesicle feminales imperfect, and the urethra opened at the cul-de-sac, which represented the vagina. Thus, instead of a double sex, the individual was an ill-formed, entirely incapable of any sexual function. See Journal de Médecine par Sédiott, tome 2, p. 319.

The half influence of mixed organs, which we shall quote, is mentioned by Dr. Baillie, to whom it was communicated by Dr. Storer of Nottingham. "The person bears a woman's name, and wears the apparel of a woman. She has a remarkably masculine look, with plain features, but no beard. She had never menstruated; and on this account she was desired by the lady, with whom she lived as servant, to become an out-patient at the Nottingham hospital. At this time she was twenty-four years of age, and had not been sensible of any bad health, but only came to the hospital, in order to comply with the wishes of her mistress. Various medicines were tried without effect, which led to the supposition of the hymen being imperfect, and the menstrual blood having accumulated behind it. She was therefore examined by Mr. Wright, one of the surgeons to the hospital, and by Dr. Storer. The vagina was found to terminate in a cul-de-sac, two inches from the external surface of the labia. The head of the clitoris, and the external orifice of the meatus urinæ, appeared as in the natural structure of a female, but there were no nymphs. The labia were more pendulous than usual, and contained each of them a body resembling a telicile of a moderate size, with its cord. The mammary resembled those of a woman. The person had no desire or partiality whatever for external sex." (Morbid Anatomy of some of the most important Parts of the human Body, 2d ed. p. 416.) This narrative leaves very little doubt, that the individual was a male, with the generative organs imperfect, as not to have exerted their usual influence on the frame in general: there is no evidence of any female organs being present here.

We repeat then, that there is not only no instance recorded, of perfect male and female organs united in the human species, as to constitute an individual capable of exerting
ercing the generative functions of both sexes—of impreg-
inating or being impregnated—but also, that there is no
clearly described instance of the final mixture of organs
in any human person, ascertained by actual dissection,
and testified by persons of competent anatomical skill. All
the supposed instances of hermaphrodists must be traced
to one of the following classes: 1. Those unusual situations
of certain organs and their conformations, various monstro-
lities, or imperfectly developed male organs, or a greater
prominence than usual of some female parts; occasion a de-
viation from the accustomed type, supposing to constitute
hermaphrodism, very capable, when allured by lies and fraud,
of imposing on those who knew nothing of natural appear-
ances, and often mistaken by those who ought to have
known better. Hence have arisen the numerous statements,
contained even in the writings of anatomists and physicians;
and tending to prove the existence of the prodigy, of which
no well authenticated fact has hitherto determined the reality.
A found spirit of criticism, founded on a more accurate
knowledge of natural appearances, reduces to their just
standard those singular deviations from the ordinary type,
which ignorance, credulity, and a love of the marvellous,
have drawn such extravagant and ridiculous con-
sequences.

3d Class.—Male individuals, with unusual formations of
the urinary and generative organs; (androgyne.) Where
the ordinary type is considerably altered, an appearance is
sometimes produced, very capable of deceiving superficial
observers; there is a kind of sketch, or imperfect attempt,
at a double apparatus of organs. But the male sex gene-

erally predominates very clearly in these cases, and the
antiquity depends commonly on the testes being contained in
separate parallel folds of the skin; the penis being imper-
forate; and the urethra opening in the perineum, on the sur-
face of a blind pouch, having a red and tender appearance,
and easily mistaken for the vagina. In such an individual
the penis, being imperfect, and probably smaller than usual,
as considered a large citoris; the folds of skin holding the
testes very much resemble the female labia, and the red flt,
between which the urethra ends, is tolerably analogous
to the vagina. The imperfection of the penis, and the opening
of the ejaculatory ducts near the perineum, at which their
contents escape, deprives these individuals of the power of
procreation; and the facility of their marriages, if they
cnto that state, is quite of their imperfect formation, arises
c. e. from this cause. The testes and seminal vesicles of
males appear to be perfect, in those cases. The individuals
experience the ordinary sexual desires, and the seminal fluids
are expelled at the unnatural opening in the perineum. A
similar deformity occurs not unfrequently in the goat and
sheep; Aridle having observed it in the former. The
reader will find examples in Halter's Commentarii de Her-

maphroditis, where a vast number of instances is quoted;
in Writberg's Commentatio de Singulari genitalium Deform-
itate in puero Hermaphroditum Mentiente; § 7, note 6: in
Moronii Historiae Naturae de la Femme, tom. 1. p. 224: in
Mertrud, Dissertation fur la femme Hermaphrodite,
qui paroit aux yeux du public, Paris 1749, folio: Agoty, Ob-
stractions de l'Histoire Naturelle, la phisique, &c. avec
des plans, des imprimés en couleur, Paris 4to. 1752.

An instance, similar to the kind just described, is related
and drawn by Writberg; in the memoir above quoted, but
there was this difference, that the rectum, as well as the
urethra, opend in the unnatural situation in the perineum;
this male child had been christened by a female nurse.

Other less essential deviations from the accustomed organi-
zation have given rise to the opinion that the individuals were

hermaphrodites. A fissure, of various depths, has existed
in the perineum; covered with a secretion from numerous
sebaceous glands; when all the other organs were perfect in
every respect. Writberg knew an instance of this kind at
Gottlingen: the individual was always deemed an herma-
phrodite, but he had the natural dixics and powers of a
male. The absence of the testes from the scrotum has
given rise to the same opinions. A confinement of the penis
and the urethra, by a particular formation of the integu-
ments, has occasioned persons to be reputed hermaphrodites.
In thefe the urine is in the direction downwards, and the
confinement of the organ will not allow of its performing
the sexual functions. The parts may be set free by a fur-
ged operation.

The last description of males, supposed to be hermaphro-
dites, are those in whom the urinary bladder is deficient,
together with the lower and anterior portion of the abdo-
nal muscles and integuments, and the lymphatic pabul, a
red and felible mass of an irregular and fungous-like sur-
face, with the ureters opening in it, is placed at the lower
part of the abdomen. Considerable alterations take place in
the generative organs, in consequence of this deformity.
The urethra is deficient, and the penis consequently imperfect.
The female ducts open near the fungous mass above-men-
tioned, or on the open surface of the urethra, or even ter-
ting to the bladder external. As the tubercles of the in-
chus are at an unusual distance from each other, the crura
penis are concealed within the body for a greater length,
and the prepuce of the organ is extremely short, fel-
dom exceeding two inches in length, even in the adult.
The urethra appears as if it had been slit open, forming a
band or grooves, instead of a perfect canal, and rendering
the glans penis biffid. The situation of the urethra is also
very remarkable; for, instead of running, as it naturally
does, in the lower angle formed by the junction of the cor-
pora cavernosa, it has commonly passed along the upper
angle, giving the penis and glands the appearance of being
inverted. That the part now described is really the urethra,
is evident from its vesicular surface, with Incime opening
upon it, from the presence of the cappu gallinaginis, and of
the openings of the female ducts. In consequence of the

glands being bifid at its upper surface, the prepuc is at-
tached only to the lower half, and is connected by a frenum,
as usual. The testicles, in some instances, are contained in
the erotonum, in others in folds of integument resembling
the puerine scrotum of the male, and in some do not descend.
The testicles are rarely pendulous, being incrusted in tradition
consequence of the separation of the osa pabul. The sexual
appetite, in some of these individuals, has been weak, in
others strong, in others altogether wanting. It is evident
that they are not capable of procreating the species, in con-
sequence of the shortness and imperfection of the penis,
and the female ducts opening externally. See Dr. Dunlop,
un, on this subject, in the Edinburgh Medical and Surgical
Journal, vol. 17, pp. 423 and 152; where he has collected to-
gather a vast number of cases.

3d Class.—Female individuals; (androgyne.) An un-
usuallv large size of the citoris, is one of those causes
which have led to mistakes concerning the sex. This is not a
common occurrence in these countries, but is said to be much
more frequent in warm climates; insomuch that a surgical
operation for removing the part is described by the Arabs.
Thefe individuals are perfect females in all other cir-
cumstances of their organization, and the mental dischuge
characterizes them. In many of the recorded in-
stances of this description, there is probably exaggeration,
as any enlargement of the citoris can hardly make it suffi-
ciently
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Ecently like a penis to give rise to mistakes. A gipfey applied to Columbus for the removal of a clitoris which incommode
d her. The famous hermaphrodite negro of Angola, exhibited in London, was in the same cafe with the gipfey
mentioned by Columbus. Parfons has collected many facts of
this kind. Mr Home relates an instance in a negro.
She was of the M undo nation, 24 years of age; her
breasts were very flat; she had a rough voice; and masculine
countenance. The clitoris was two inches long, and in thick-
ness resembled a common-sized thumb; when viewed at some
distance, the end appeared round, and of a red colour; but, on
a clofer examination, was found to be more pointed than
that of a penis, not flat below, and having neither prepuce
nor perforation; when handled it became half erected, and
was then fully three inches long, and much larger than be-
fore; when she voided her urine, she was obliged to lift it
up, as it completely covered the orifice of the urethra.
The other parts of the female organs were found to be in a na-
tural state." A gentleman, who had practifed midwifery
among the negro women, flated that an enlarged condition
of the clitoris was common among them. Parfons and some
others, in confluence of the ftructure just defcribed,
have defcribed all hermaphrodites to the female sex. Whe-
ther this unusual size of the organ can be produced, " per
feferatum abulum et climitoris" is very doubtful. In order
to avoid all mistake concerning fex in newly born children,
fmall male, or females, that the clitoris is proportionally very
large at that age.

A prolaplus of the uterus is another circumftance which
has occafioned females to be deemed hermaphrodites, and
even to be publicly exhibited as fuch. A perfon of this
kind came to Paris in 1609, dreffed as a man, and wearing a
fword. She pretended to have the organs of both sexes,
and to be able to employ both, and exhibited her perfon to
the curious for a fimilar gratification. Besides the numbers
who took up the common opinion of her being an herma-
phrodite, and who could not be supposed sufficiently well-in-
formed to judge of fuch a subjed, feveral physicians and
furgeon fell in with the vulgar sentiment, and gave certif-
cates which prove incontrovertibly, that a great reputation
may be acquired in the profefion, without any real talents, or
any large stock of folid information. Saviard, after in-
fefting the parts closely, found that the cafe was a pro-
laplus uteri, which he reduced. When the female had re-
covered, she pretend a requief of the king for permiffion
to take again the female dress, in fpite of the magiftrates of
Toulouf, who had ordered her to clothe herfelf as a man.
See Saviard, Recueil d'Oblervations, obf. 15.
An instance of the fame kind is related by Mr. Home.
A French woman had a prolaplus uteri at an early age,
which increafed as she grew up; the cervix uteri was un-
commonly narrow, and at the time I faw her, when she was
about 25 years old, projefted several inches beyond the ex-
ternal opening of the vagina; the surface of the internal
parts, from conflant exposure, had lof its natural appear-
ance, and resembhed the skin of the penis; the orifice of the
os tinent was mistaken for the orifice of the urethra. This
woman was known as a curiofity, and in the course of a few
weeks made 400l. I was induced by curiofity to visit her,
and on the first infpection difcovered the deception; which,
though very complete to a common obferver, must have
been readily detected by any perfon intimately acquainted
with anatomy. To render herfelf full more an objedt of
curiousity, she pretended to have the powers of a male." Phi
cif. Transf. 1759.

We have already mentioned fome infances where the ge-
nerative organs, although belonging clearly to one fex, had
been imperfectly developed, and consequently had not pro-
duced their usual effed in modifying the form of the body,
and imparting it with the sexual character. There are other
infances, in which men or women, having their organs ap-
parently of the accenteded magnitude, partake reftectively
of the charaders of the other fex, probably from the caufe
just alluded to, of the fexual parts not exerting their full
influence on the frame. Such infances may be accounted
for, and, in the human fubjed, to resembide the fexe mar-
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*Figuratus urinarius to the clitoris in the female, will afford the
decision, as also the want of power to pass an instrument
towards the situation of the uterus.*

...but not by the female very symmetrical, but fully
found front and warm, but the completely
the fuch fuch rough, but young
...decilion, towards the
...mitts, and the clitoris, and its different flaps;
the connection of its prepuntum to the ayin phr, and the
presence of the latter parts; the separate opening of the vagina
and mammary tubas, and the presence of the hymen; the
abence of teffes, all prove the individual to be a woman.

An adhesion of the labia to each other at their convexities
may cause a difficult in deciding; but here the abence of the
penis and teffes, the discharge of the urine at the upper
end of the labia, and the line of union between these folds,
shew us the nature of the cafe.

Much information on the subject of hermaphrodites may
be gained from the following works. Parsons’ Mechanical
and Critical Enquiry into the nature of Hermaphrodites:
Pieeck, Gedanken von den Zwittern, in the Old Hamburg
Magazine, vol. iv. p. 538; et seq. Arnaud, in Memoires
de Chirurgie. Haller, num desur Hermaphrodites,
commentaries, in the Commentaries for the year 1721.
Gottingen, tom. 14; or in his Opus Minor, vol. ii. Hunter on the
Femal and Dr, in his Obs. on the Animal Economy. Home.
Deflexion of an Hermaphrodite Dial, with Observations on
Hermaphrodites in general, Philof. Transact. 1799.
Moreau Hiflato Naturelle de la Femme, tom. i. p. 211, et
seq. Wrifler, Commentatio de Sigulari genitalium de-
formitate in puer, Hermaphrodism mentente, in his Com-
mentary, vol. i. p. 524, et seq.

Male Organs of Generation.—In the human subject these
consist of the teffes, vehicle feminales, prolate, Cow-
er’s glands, urethra, and penis: making up a secretory ap-
paratus, which is double, consisting of a right and left
organ, in the two former parts, and fingle in the latter.

The peculiarities of the apparatus consist in the small quantity of
fluid which is fennial, in the long periods for which this
fluid is retained in its reticulums; in the particular condition
of the organ destined for its emission, efferently necessary to
that act; and in the physical feeling which accompanies the
act.

The Teffes.—These organs, placed externally to the ca-
vity of the abdomen, and left protected against external
injury more moft other important viscera, are fuffreded, each
by them a considerable vascular bundle, called the sperrra-
tic cord, and contained in a kind of bag or cavity formed of se-
veral membraneous layers. A middle fepiment divides the interior
of the bag, and feparates from each other the right and left teffis,
with their coverings, which are double with the exception of
the outer one. The latter, formed by the integuments,
and called the feroitum or puric (in French les bourses) con-
dittutes a fingle bag, which envelopes all the others.
The feroitum is attached to the upper and front part of the pelvis,
unconnected in every other situation, contiguous laterally to
the inside of the thighs, in front to the penis, and feparated
behind from the anus by an interval of two or three inches,
called the perineum. A fmall fold of the skin under the penis,
a flight groove below, and a prominent line behind, con-
tinued into the raphe of the perineum, mark out fuccedvilly,
on the external surface, the symmetrical division of the
organ. Yet the right fide of the feroitum is almost contantly
more elevated than the left, in conformance of the cor-
responding femeric cord being shorter, and the teffis nearer to the
ring. The feroitum is foft to the feel, and elongated,
so that the teffes appear liden and long low; in warm weather,
in old persons, after cotion, and under the action of any
causes which have a debilitating influence on the frame
in general. It is rough and harder on the surface, and
shorter in cold weather; in young subjects, at the time of
ejacuation, and in a strong, vigorous state of the body; con-
sequently, at such times, it is applied more exactly to the
tefsis, and, drawing these organs gently upwards, shortens the
orbs. The sudden action of cold, and even of fear,
will produce the latter state of the organ. The wrinkles
which it exhibits at such times are effaced by extending it.

The coverings of the teffes succeed each other in the fol-
LOWING order: 1. The cutaneous investment, or feroitum;
2. The cellular layer; 3. Membrane of a fibrous ap-
pearance, common to the teffis and cord; 4. The feros.
membrane. The reason why the dartos is not enumerated
among these covering will appear presently.

The feroitum is continuous with the integuments of the
inside of the thighs, the perineum, and penis. It is distin-
guifhed by a brownish line from the rest of the integuments,
but follows in general the tints of the latter, being always
darker in colour. A few hair are scattered over its
surface, and their bulbs, efferently implanted, form feble
prominences from the thinness of the skin, which are not
effaced by extension of the organ. In its general organization
the feroitum refembles the skin; but it is very thick, fo
that the veins of the subjacent cellular tissue are visible
through it. The vital properties of the feroitum are the
same with those of the skin in general; but the contraction
produced by cold is more manifest in the former than in the
latter. The phenomenon seems to be the fame in both in-
fances. It constitutes the cutis aneriina of the surface in
general. This corrugation of the part has given rise to the
opinion that a muscular expansion is found under the skin in
this situation; and hence have arisen the descriptions of the
dartos. We can, however, clearly distinguish that the
contraction is in the integuments, and not in any more
deply-feated part; they feel denke and firm at this time,
instead of being left and looef, as in their ordinary state.

The teffes and cord are surrounded in their situation by a
continuous and loofe layer of cellular subsifance, placed im-
mediately under the skin, and constituting, where it divides the
tefsis from each other, the leptom feroit. This is rather
more clothed than the other fepiments, and the loofe at the surface of the teffes. Several blood-valls ramify through it, particularly veins; and hence arise an
appearance which may have authorized the opinion concern-
ing a muscular covering on a superficial examination; but
accurate inspection can discover no muscular fibres. Many
nervous filaments are also fen in this subsifance, and enable
us to explain the acute femibility offered on the removal of
the teffis in surgical operations, a little fat is fen near the
ring and the urethra; but it is completely alfrom all other
situations. Here, as in the penis, the eye-lids and
force other parts, the abundant depofition of fat would in-
terfere with the functions of the organ; and its alfrom in
these situations seems to indiate the design and foresight em-
ployed in the construction of the body as fully as the parti-
cular construction of any parts can do. However the size of
the body in general may be increased in corpulent persons,
the feroitum, penis, &c. always retain the fame dimensions.
The alfrom of fat renders these parts more efpicially sub-
ject to the wattery depofitions of affura; such effusions
often overfill themselves in the feroitum, and that organ
is generally very much increased in bulk when the affura is
considerable. The impulion of air through an opening in
the feroitum demonstrates very well the nature and extent of
this cellular layer; by diffusion of this kind it refembles
easton in appearance. Maceration in water may be employed
for...
GENERATION.

for the same purpose; as the fluid penetrates very minutely into the cellular interstices. It is continuous with the similar covering of the penis, and with the cellular substance of the perineum and groins; so that air passes from it into these situations.

The cord and testis are closely enveloped by a condensed cellular covering, which descends from the neighbourhood of the abdominal ring, and includes the organs just mentioned, together with the membranous coverings of the latter; it constitutes the ephithelial or ephithroid coat of some writers. The cremaster muscle is strongly connected with this, and contributes to the formation of the cellular sheath. This part has been described as the tunica vaginalis of the spermatic cord, but it is entirely overlooked by many writers. Its thickness differs considerably in different subjects. It is connected to the cellular substance of the testis externally; and adheres, by cellular connections, to the spermatic vessels, and to the tunica vaginalis testis, on the inside. If air be impelled through a small opening, it is separated from these parts, and may be divided for as to show that it is a distinct membrane. It then appears semi-transparent and thin, and seems to consist of fibres variously interwoven. Its thickness is much increased in ferotal ruptures, to which it gives a complete external covering. Camper has delineated it very well in his posthumous plates edited by Soemerring, and he describes it in the following paragraph: "Cremasteres igitur musculo sunt, ab oblique internum et transverso abdominis orti, per involu'm membranaceum sub cute feroti differt, quorum velamentum efformant, funiculum spermaticum et telem utqueque eingen, quodque in hernia cordium descensum humani testis, et in multa fibri invicem imperfecte laemelis consistit dividum, cum chirurgia hernias attingitum. Velamentum illud facile a fece hermici digitis separatur; formam autem adheret vasa spermaticae." Leen's herniarum, p. 13.

The serous membrane of the testis is called the tunica vaginalis, and the same should be confined entirely to it, as most of the anatomical descriptions apply to this part only. Like all other serous membranes, this forms an entire and unperforated bag. Its arrangement is simple. It forms a pouch-covering, and appearing to include the testis and epididymis, as the heart is included in the pericardium. When an opening is made into it, and air is impelled, it is elevated into a bag on the front and sides of the testis. At the posterior edge of the organ it is reflected over its surface, covering the epididymis, a small portion of the spermatic vessels, and the whole testis; and giving to these parts a smooth external coat. The tunica vaginalis therefore may be said to consist of two parts; viz. an external portion, forming the bag, which includes the testis; and an internal, reflected over the surface of the organ. The two are continuous at the back edge, and at the upper and lower ends of the testis. The bag-like portion of the membrane is covered by the fibrous investment already described; the reflected part adheres very closely to the epididymis and testicle. The tunica vaginalis is very thin, and everywhere cellular on its external surface; internally it is smooth, polished, and moistened by a serous secretion, which, in an increased quantity, constitutes hydrocele. There is hardly any fluid fluid in the ordinary state of the part. Sometimes there are partial adhesions between the opposed surfaces of the two portions of the membrane; and sometimes a general adhesion, by which the cavity is entirely destroyed, is produced by the operation for the radical cure of hydrocele.

In man and quadrupeds the testicle consists of two parts; viz. the proper testis, and the epididymis, which adheres to it behind. Ordinarily the ferotum contains two of these glands, a right and a left one: but this number is not invariable. We shall explain hereafter how it may happen that the ferotum should contain no testis, or only one; and, if authors could be credited, we might cite examples, in which there have been three, four, or even five. We believe that the number never exceeds two, that the statements now alluded to have arisen from the swellings incidental to these parts, being mistaken for testes, and that there is no observation deferring of credit by which this affection can be contradicted. The ordinary size of the gland in the adult is an anatomical fact known to each individual; but there are some varieties in this respect. Long continued abstinence probably causes a shrinking of the organ; and a similar diminution, to a much greater degree, may be occasionally observed in old subjects, when the function of the part has ceased, without any disease. On the contrary, when venereal enjoyment has been habitually indulged, temporary abstinence will cause a swelling of the organ, with some pain; and this may be relieved by a spontaneous discharge of the effusion. Again, there are differences of volume from original formation. The right and left glands are not always of the same size, nor is this size particularly observed to exceed the left, as some have asserted. The figure of the part is pretty exactly oval, with the two ends placed perpendicularly, and the surface flattened in the direction of the small diameter. The extremities, which are distinguished by the epithets superior and inferior, are not in the same perpendicular line; the former is inclined forwards and outwards; the latter backwards and inwards. The two ends are sometimes almost interior and posterior. The flat sides, which are external and internal, are turned, the former towards the thigh of the same side, and the latter towards the corresponding surface of the opposite gland. The edges of the testes, which are anterior and posterior, are placed obliquely, so as to float from above backwards and downwards. The anterior edge is sometimes described as the interior, and the posterior as exterior. The epididymis is a thin and elongated organ, placed along the back edge of the testis, to which it adheres by means of the tunica vaginalis and blood-vessels, smaller in the middle and enlarged at the upper and lower ends, and reflected at the latter, to form the deferens. Its upper extremity is called the caput epididymidis or globus major (vice de l'epididyme); and this adheres very firmly to the upper end of the testis, being placed rather above, as well as behind it. From this point the organ descends in a thin and flattened form, distinctly seen as a separate part in the side of the testis, which is turned towards the thigh, but not on the opposite surface. It swells again at the lower end into the globus minor (queue de l'épididyme) and then turns up to form the vas deferens. The spermatic cord is attached along the posterior edge of the gland, and the greater or left obliquity of the testis depends on the mode of its connection. A cord, composed of the same parts, suspends each testis in its place, but it is rather longer on the left side; a circumstance which has been noticed by painters and statuaries. The pathologist ascribes to this circumstance the more frequent occurrence of varicocele on the left side of the body. The distance of both organs from the ring is variable, and depends on the size of the forotum, and the cremaster muscle. These two parts generally contract together. The concurrence of the gland is felt to the feel. As it is covered almost entirely by the fibrous membrane already described, it acquires from this circumstance a smooth and polished surface; its whiteness arises from the tunica albuginea.

Structure of the Testis.—The glandular part of the organ,
in which the seminal secretion is immediately effected, is a light-brown pulp, considerably softer than the parenchyma of the other glandular organs, contained in a thin fibrous membrane, which determines the exterior configuration of the part, and the consistence which it presents on examination. This membrane is named the tunica albuginea. It is seen through the reflection of the tunica vaginals, which envelops the testicles, and adheres to it very closely. Yet, notwithstanding the strength of this adhesion, the serous layer may be partially separated by dissecting from the epididymis forwards. But, over the general surface the union is too intimate to admit of separation; and consequently the serous layer and the true albuginea are described ordinarily as composing one membrane under the latter name. It is from analogy, rather than the direct testimony of anatomical observation, that we denominate them as distinct parts. Along the posterior edge of the testis, the albuginea is perforated by numerous openings for the passage of the seminal and blood-vessels. From the inner surface of this membrane are detached numerous delicate processes penetrating the substance of the testis, and forming partial septa, by which the glandular mass is slightly subdivided into smaller portions. Some of these processes seem to consist of blood-vessels. The structure of this part differs among the fibrous membranes: it is dense, very firm, of a peculiar white colour, and possessing some blood-vessels. Its external surface is everywhere covered by the reflected tunica vaginalis, except at the back of the testis, and its inner surface is in contact with the glandular substance of the organ. The great elevenses and filaments of its texture explain to us the peculiarly hard feel of the inflated testis, as the membrane yields with difficulty to the detention produced by the swelling of the contained vascular parts. It is manifestly thicker where the fibrous tubes penetrate it; and in this situation we observe the corpus Highneri, concerning which we have further observations to make below. The albuginea possesses extensibility, and the corresponding contractility; the swellings of the testicle, from various causes, swell the former, and its subsequent return to the natural size, as well as the shrinking of the part from age demonstrate the latter. It is very subject to conversion into carthage. Little excrescences are sometimes observed on the surfaces of the gland, about the size of a pin’s head.

The tunica albuginea is filled with a soft pulp, matter, of a light brownish-yellow hue, and divided into small portions or lobuli. Incomplete septa, along which the small arteries and veins run, divide these portions; but the partitions are not merely vascular. They are attached, as we have already observed, to the internal surface of the albuginea. Behind, they unite together in a white cellular layer, running along the back edge of the testicle, from above downwards. Such are the appearances exhibited in the recent organ, without any dilatation or preparation. Its substance is very firm; so that when it loses more than eight-tenths of its weight. A more accurate examination, particularly with the affinities of maceration and putrefaction, discover that all this pulp mass is made up of convoluted serpentine threads possesting some filaments and connected together by a very soft cellular substance. These, which are called the tubuli or ductus seminiferi testis, seem about the size of an ordinary sewing thread, and can easily be drawn out with a needle, after maceration, to the length of an inch and even more. These threads are tubular, cylindrical thick in their coats with small calibre, plentifully supplied with minute vascular ramifications, from which however injected liquors do not pass into the ducts. They do not ramify, but pass in a tolerably direct line to the cellular part at the back of the testis. That they are tubular is proved by the possibility of injecting them with quicksilver from the vas deferens: this indeed often fails, but in some cases the tubuli are filled in this way through the whole testis. The diameter of one of these ducts, according to Monro, is 1.250th of an inch; or 1.125th when injected with quicksilver. By the calculations of the same anatomist, the testis should appear to consist of 62,500 tubes, supposing each to be one inch in length: and consequently, if they were joined into one tube, it would be 5309 feet and 4 inches in length. The convolutions and ramifications of these ducts are so numerous, that they do not continue their course in the same straight line, for more than 1.425th of an inch.

The white and firm cellular line at the back of the testis, just at the adhesion of the epididymis, is called the corpus Highneri. Many anatomists have described it as tubular, and have aligned to it the office of conveying the semen to the epididymis. Such a part obviously exists in the testis, and is still more manifest in animals, as in the boar, than in the human subject. Haller, who has given the most accurate account of this subject, says, “After I had accurately filled the vas deferens with quicksilver, I observed in the corpus Highneri numerous vessels, larger than the tube of the epididymis, running according to the length of the gland, serpentine, easily torn, and communicating with each other.” Elem. Physiol. v. 7. p. 435. In these the tubuli seminiferi testis terminate, and they constitute the rete vasculorum of the organ. The ducts contained in each part of the tubuli seminiferi end in one straight tube, which terminates in the rete testis. A certain number of tubes, called the vasa efferentia, convey the semen from the rete vasculorum to the commencement of the epididymis. Obscure notices of these vessels may be found in various writers, and De Graaf in particular has described them. But the labours of Haller have thrown the greatest light on the subject. “When, after various unsuccessful attempts, the continued labour of an hour or more had enabled me to fill completely the vas deferens, I observed the head of the epididymis to be made up of vascular cones, amounting in number to twenty or thirty, and connected together by cellular substance before any dilatation had been used. Each of these cones is made up of a single small vessel, larger however than the tube of the epididymis, convoluted into innumerable folds. The basis of the cone is turned towards the epididymis; its apex is a vessel proceeding downwards to the testis, perforating the albuginea, and communicating with the rete testis.” Ibid. p. 447.

The epididymis, of which we have already described the position and figures, is distinguished by its greyish colour from the shining whitenss of the testis. Being placed at the point where the cord is attached to the testis, it is surrounded by blood-vessels, of which much are distributed to itself; its surface is partially covered by the reflection of the tunica vaginalis, which adheres to it closely, except at the angle of reflection, where the convulsion is looser. Its structure is much more easily unravelld than that of the testis, for, when filled with quicksilver from the vas deferens, it is proved to consist of a single tube, almost infinitely convoluted upon itself, excepting only a small part of the caput, which is made up of the vascular cones. The latter uniting together form one very small tube, which by its serpentine course and turns, connected to each other by cellular substance, containing the ramifications of blood-vessels,
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Veils, forms the body of the epididymis. As it descends along the back of the testis, it increases in diameter, and at the same time is proportionally less convoluted. In a considerably enlarged state, it is reflected from the lower end of the testis, until a little convoluted at first, but soon forming a straight tube, called the vas deferens. By carefully destroying the cellular substance, which connects together the convolutions of this tube, we can demonstrate the facts now mentioned concerning the structure of this organ. In such a process the tube can be drawn out to a surprising length, as much as 20 feet, according to De Graaf. In 420 times the length of the epididymis in its natural state, according to Heuermann. Monro has taken great pains in measuring and calculating the dimensions of this part: he finds the diameter of the tube, on an average, to be 1/50 of an inch, its length 31 feet, and the number of its turns, as it does not go in a straight direction at any part, for more than 1/20th of an inch, 1100. (De femine et testibus in varius animalibus, p. 31 and 32.) As a further proof, that the organ is made up of a single tube, we may observe, that if we cut it across while we continue to inject quicksilver from the vas deferens, the fluid escapes from one orifice only, and when that is tied, no more runs out.

Thus, the semen, first formed in the small fertile veins (tubuli testis) which make up the pulp masts of the testis, is deposited from these in the straight seminiferous tubes, which convey it into the rete vasculiferum, placed at the back of the testis, and connected to the abbuinica, where it forms the corpus highamori. Hence it passes through the vasa efferentia, or eceretoria testis, about twelve in number, which perforate the abbuinica, at the upper end of the testis, and then form, in a convoluted state, the peripertate vascular cones, which make up the caput epididymis. These unite into a single small tube, which, by its numerous turns, first forms the epididymis, and then ends in the vas deferens. Haller, Programma de vasa seminalia, Gotting, 1745; and in Oper. min. t. 2. p. 5.

From the origin of the convoluted tubuli seminiferi, to the termination of the epididymis in the vas deferens, the semen goes through a series of vesicles, which are folded 169,860 times, and, if extended in a straight line, would exceed 42 feet in length. Monro, lib. cit.

The small ends of these tubes prevents us from ascertaining their texture, or the nature of their fibers. The tubuli testis presents considerable variations, as we may ascertain by extending them until they break, and by observing the column of quicksilver which they support, when we inject them. The tube of the epididymis presents firm and strong fibers, in comparison to its cavity.

A small tube, either straight, or slightly convoluted, is sometimes observed to arise from the epididymis, and after passing to various distances on the cord, to terminate in a cul-de-sac. Its size is equal to that of the tube of the epididymis itself. This circumstance was first noticed by Haller, who called the vesel vaeulum aberrans. (Progr. de vasa seminal.) He did not undertake to determine its termination or nature, observing that it proceeded along the cord, incerto fine: an lymphaticum? The existence of the vaeulum aberrans has been confirmed by Monro, who injected it in four out of fifteen testicles; and he adopts the opinion suggested by Haller, of its being a lymphatic. Mr. Cruikshank takes a different view of the matter. "It is," he says, "a laius nature, and either forms a cul-de-sac, or, after many convolutions, returns back again upon itself, and terminates where it begins. It sometimes mounts four inches upon the cord, and then terminates in a coccus, or blind end. Sometimes it is not a quarter of an inch in length. I have seen it convolute, like the epididymis itself; from which it could not be distinguished, till, by maceration and diffusion, the cellular membrane had been removed. It may be compared with the diverticular illi, so frequently met with in the human intestines." Anatomy of the absorbing Vessels, p. 141.

Tubes of the Testicles: Spematis cord. Under the interior extremity of the kidney, and about the middle of the psoas magnus muscle, we observe a fasciculus of blood-vesseils, lymphatics, and nerves, placed behind the peritoneum, and connected to that membrane by a cellular substance: this is the commencement of the spermatic cord. It descends over the psoas muscle, passing at the same time rather outwards, crosses the ureter, continues its course between the iliacus internus, and arrives at the upper opening of the abdominal ring. Here it is increased by the accession of the vas deferens, from the side of the bladder. It now penetrates the upper aperture of the ring, going under the inferior edge of the obliquus internus, and transversus abdominis: then it turns downwards and forwards in the canal placed between the two openings of the ring, covered in front by the aponeurosis of the obliquus externus, and lying behind on the falcia transversalis. In this part of its course, it is further increased by the accession of the cremaster muscle. The cord finally emerges through the opening in the tendon of the obliquus externus, and then turns suddenly downwards; lying not so much on the bone between the two columns of the ring, as on the outer column itself, so as to cover its insertion into the pelvis. Just at the point, where the cord enters the abdominal canal, it lies on the root of the epigastric artery. As it is placed behind the peritoneum, in the whole of its descent from the loins to the abdominal ring, that membrane is not perforated at the point where the cord leaves the abdomen. Nor is there any sheath continued from the peritoneum, along the cord, to the tunica vaginalis; although such a structure has been ascribed to the human subject from the observation of animals, in which it is really found. In human males, indeed, a membranous cavity, produced by a continuation of the peritoneum, lies over the cord; but this is diseased; and in a particular period of foetal existence, there is a canal leading from the abdomen to the tunica vaginalis, but this is ordinarily closed before birth. Neither is there any foundation for the description of two layers of the peritoneum, of which the ureter is said to be accompanied by the cord. Escaping through the opening in the tendon of the obliquus externus abdominis, the cord descends in a straight course to the testis, covered externally by the fibrous sheaths already described, and growing rather larger as it approaches the organ. Copious soft cellular substance, with very little fat, connects together the component parts of the cord.

The spermatic are the chief arteries for supplying the testes and their coverings. These vessels are the longest in their course, compared to their diameter, of any in the body; they were known to the ancient physicians, and called by them the seminal vessels. They would probably have escaped the diligence of the physician, had not the importance of the part, which they supply, been more attended to, than the size of the tube. They arise, most commonly, from the front of the aorta, between the origins of the renal and inferior mesenteric vessels; either near together, or at a small distance from each other. This is the case in twenty-two out of thirty-five instances. They may arise from the aorta higher or lower than the point, which has been mentioned. The artery of the right side sometimes comes from the right renal; but the left arises much more commonly from the renal artery, infomuch, that this has been described as the accustomed origin. Often a smaller branch from the renal joins

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the trunk of the spermatic. It descends at an acute or half-right angle, and goes in front of the vena cava, on the right side of the body; but has been seen behind that vein. Its course is rather tortuous; joining the vein on the psoas muscle, it descends along the cord, and arrives at the testis in two branches. It gives off small twigs to the renal capsule, fat of the ilium, rectus, lumbar glands, and the cord itself. The area of the vessel, instead of being diminished by all these branches, is rather increased. Several ramifications are distributed, below the ring, to the cremaster, tunica vaginalis, and cellular substance of the scrotum. Ultimately it is distributed in numerous branches to the epididymis and testicle; these partly perforate the back of the albunigma, and are employed in supplying the pulpy substance of the organ. Some of the ramifications communicate with branches of the epigastric artery. Smaller arteries come to the spermatic cord, or testicle, from the epigastric, or from the circumflexa abdominis. The testis, and its cellular substance, receive twigs from the arteries of the thigh. 'Hence,' says Haller, "tying the spermatic arteries does not destroy the testicle, on account of the supply derived from the external vessels; but as these are very small, the venerable powers of the organ are loft." Element. Physiolog. v. 7. p. 458.

It has been affected by many anatomists, and some of considerable celebrity, that the spermatic arteries and veins communicated together, and Zuckermann has drawn large communications between them. That injection will sometimes pass from one order of these vessels into the other, when dexterously impelled, is very true, and it holds equally good of other parts; but there is no more than the ordinary kind of communication here.

The spermatic veins, like the arteries, are two in number: the right usually terminating in the front of the vena cava, the left in the renal vein, either alone, or in conjunction with the cephalic, or a lumbar, or the hemiazygus. The left spermatic may end in the vena cava; or the right in the renal vein. Sometimes the vein ends by two, three, or four branches in the cava and renal vein. The size of the vessel is very considerable when compared to that of the artery: its diameter being nearly a line and a half. When the vessel has reached the psoas muscle, it divides into branches, which unite again, and give origin to other ramifications, which also anastomose together, and on: thus a large plexus of veins is formed, constituting the corpus pampiniforme, forming the chief bulk of the cord, and increasing in size as it approaches the testis. Branches corresponding to the arteries, which arise from the spermatica, join the vein. Valves are found in the spermatic veins, but none at their terminations: the tendency to the formation of varices in these vessels, shows the necessity for the existence of valves. The veins of the scrotum, derived from the epigastric, communicate with the spermatic, and with those of the penis.

The absorbers of the testicle are numerous and large, but have not been long known. Nuck had demonstrated them by inflating the spermatic veins; and Monro rejected them when he had thrown quicksilver into the vas deferens. He observed four or five valvular vessels arising from the ret. testis, and ascending the cord. Haller candidly admits that he did not know much of them: 'In homine aliquid visi majuscula, non tam venae numerosa, in fimulculo feminali cum venas ascendentia, valvoluca, ut tamen necque originem, neque finem factis accurate viserem.' (Elem. Physiol. v. 7. p. 436.) Mr. Cruickshank has given us the most perfect account of these vessels. 'The absorbers of the tunica vaginalis,' says he, 'are easily discovered, lying between the reflection of that coat and the tunica albuginea. Though they are thus situated, I know that they belong equally to the body of the testicle; they are in great numbers, and I have sometimes covered the albuginea with absorbers injected with quicksilver; perhaps there is not any part of the body where the absorbers are larger or more numerous, in proportion to the part, than they are here. They soon leave the albuginea, and get upon the cord, where they are joined by others, to be described presently; but the tunica vaginalis has also other absorbers, upon the anterior and lateral parts, which have not the least connection with the body of the testicle, nor with the albuginea, and which also soon blend with the former, on the beginning of the cord. The absorbers, which arise out of the ret. testis, are exceedingly large, and appear to have no connection with its coats. A very beautiful preparation of these vessels I made at Windmill-street, at least ten years ago; I injected the vas deferens with quicksilver, and had in view not only the filling of the epididymis, but the tubuli testis themselves. I had forced the mercury along the epididymis, and was delighted to see it get into the body of the testicle; the mercury continued to descend very quickly through the glads injecting tubes; but I soon found that it was not running into the tubuli testis, but into some vessels, which mounted along the cord: these I soon perceived were absorbers. I have also injected them from every part of the epididymis, from its inferior extremity, from the middle, and from the lower end. The absorbers, having reached the cord, form from six to twelve trunks or more; some of these are sometimes larger than a crow-quill: they do not appear to anastomose with one another as they pass along the cord; at first they run straight upwards, in the direction of the ring of the external oblique muscle; after which they are bent upon themselves, and pass a little way in the direction of the spine of the ilium; after which they are bent as it were a second time upon themselves, and run over the anterior surface of the psoas muscle, and terminate at last in the lumbar glands. The reason of their termination, so distant from their origin, will easily occur to those who reflect that the original situation of the testicle was at this place, and that it was natural for it, like the other vasa, to receive its blood-vessels and nerves from the nearest trunks, and to return its absorbers to the nearest glands.' Anatomy of the absorbing Veins, p. 140.

The nerves, like the blood-vessels of this organ, arise from the trunks contained in the abdomen, and have consequently a long passage to their ultimate definition. They are rather numerous than large. They are produced from the renal plexus chiefly, with additions from the meroenteric and hypogastric plexuses, and from the trunk of the great symphatico. They are closely connected to the vessels in the cord, but can hardly be traced to the testis. The feromut and cremaster are supplied by the lumbar nerves. Although the testis does not possess acute sensibility, compression of the organ causes a peculiar, dull, and intolerable sensation, of the most distressing kind.

Besides the parts just enumerated, the cord contains the vas deferens, which will be presently noticed; and the cremaster muscle, which is described under the article Chemaster. A soft and loose cellular substance unites together the parts which have been just mentioned; it resembles that of the feromut in not containing fat generally; but in corpulent persons small depositions of adipous matter may be observed in it. It does not communicate with that of the feromut, as the fibrous covering of the cord is interposed between them; and it is much less subject than the latter to anatomic affections. Indeed its quantity is proportionately less abundant. Yet in rare cases it has been the seat of aqueous infiltration, constituting a very uncommon kind of hydrocele of the cord: the latter complaint shews itself more frequently
The vas deferens, or deferent, is the tube which conveys the semen from the epiphysis to the urethra. Its figure is for the most part cylindrical, and it consists of a very small tube, which will only admit a large bristle, with very thick sides. Although its caliber is so small, the diameter of the part on a section equals a line. The substance of its sides is very firm, and cuts like cartilage; hence we can dilate it by the feel from the other component parts of the cord, by sliding them between the finger and thumb in the living subject. The internal surface of the tube is smooth. Nothing of a muscular structure can be discerned in its composition.

It arises from the posterior and inferior part of the epiphysis, ascends behind and a little on the inside of that organ, and then continues its course along the spermatic cord behind the vessels to the ring. Compression of this part occasions the same kind of pain as is experienced when the testes are injured; and the very acute suffering observed on tying the cord in calf-latin, has been explained by the circumstance of this tube being included in the ligature. Perhaps this explanation may be doubted, as the nerves of the testes are also among the compressed parts; however, the vas deferens is easily omitted, as its hard feel enables us to separate the vessels which lie in front, and are connected to it by a loose cellular substance. It passes through the abdominal canal, holding the same relative situation to the spermatic vessels. It separates from them behind the opening, and then bends downwards and backwards along the surface of the psoas muscle, and of the iliac vessels, to enter the pelvis. Here it becomes attached to the posterior and lateral part of the bladder, and descends obliquely from without inwards, just in the situation where the peritoneum is reflected to the bladder from the side of the pelvis, connected by cellular substance on one side to the bladder, and on the other to the peritoneum, and situated in front of the rectum. In this course it descends the umbilical artery, behind which it passes; it also crosses the ureter, being placed between the lower extremity of that canal and the bladder. At the lower and back part of the latter organ it turns forwards and inwards, so as to approach towards the canal of the opposite side, still connected to the surface of the bladder; in this direction it continues along the under surface of the organ, within the vesicula seminalis, and connected below by cellular substance to the rectum. In the neighbourhood of the prostate, the two vasa deferentia are placed close together, and each unites just at the surface of the gland, with the anterior extremity of the vesicula seminalis. The canal, resulting from this junction, sometimes called the ejaculatory duct, penetrates the substance of the prostate, from below and behind, upwards and forwards, and opens in the urethra at the side of the verumontanum.

The commencement of the vas deferens is a little convoluted, and rather larger in its calibre: at the upper part of the testis it becomes straight in its course, and its area is diminished. Under the bladder it is considerably enlarged again, where it lies along the inner edge of the vesicula seminalis. It has here sometimes a highly serpentine course, and presents a flattened form. Its cavity is proportionally augmented, and, instead of a cylindrical tube, presents a reticulated texture, like that of the vesiculae masculinae. Its surface is irregular and tuberculated in consequence of this cellular structure. After receiving the tube of the vesiculae masculinae, it is again diminished remarkably in size, and forms a small cylindrical canal.

The vas deferens receives arterial and venous ramifications from the trunks in the neighbourhood of which it passes. Nothing is known of its nerves.

It is by no means common in animals for the vas deferens to join the vesiculae masculinae in the manner already described. In all cases where there are testicles, that duct conveys the secreted fluid into the urethra, there being no vesiculae in some, while in others they terminate by separate openings. The communication between the two parts in man is a very free one; and, although the canal formed by their junction proceeds in a straight direction to its termination in the urethra, yet quicksilver, or any other injected fluid, or air thrown into the vas deferens, paffes into, and diffuses the corresponding vesicula before it gets into the urethra. The composition of the common canal by the firm substance of the prostate, the small size of the tube and of its opening, and a particular turn made by it, have been assigned to explain this fact. If the injection is pushed further, it will go into the urethra. Fluids thrown into the vesicula also diffuse the vas deferens, but are more readily admitted into the urethra, as the capacity of that vesicle is not considerable.

The vesiculae masculinae are two soft bodies, resembling, when undisturbed by dissection, membranous tubes with blind extremities, convoluted, and therefore marked with ridings and grooves on their surface. They are situated under the inferior flattened surface of the bladder, and upon the upper surface of the rectum, being connected to both these organs by loose cellular adhesions. They are pyramidal, with the apex placed forwards, and the basis backwards and convergent from behind forwards. Their anterior extremities, joined, as we have already mentioned, to the vasa deferentia, lie on the upper and back part of the prostate, and would be in contact with each other, were they not separated by the tubes just alluded to. From this point they grow gradually broader and are divergent, terminating behind in rounded ends, which are the most distant from each other. The superior surface, in contact with the bladder, is rather flattened: the inferior, lying upon the rectum, is slightly convex. The vas deferens runs in contact with the inner margin, and the outward edge is turned towards the side of the bladder. The posterior broad and rounded ends are partly in contact with the peritoneum, and lies at the sides of the pouch, formed where that membrane is reflected from the bladder to the rectum. Numerous arterial and venous ramifications, particularly the latter, and a considerable quantity of cellular substance, surround these organs in all directions, and connect them to the neighbouring parts. In some individuals the pyriform shape is not well marked; but the anterior and lower end is always small. The flattened appearance of its surfaces is altered by injection: the whole organ then appears thicker, and the tubercular ridings of the surface are more distinct.

A very different appearance is produced when these bodies are unravelled by the anatomist. Each vesicula is then found to consist of a single tortuous tube, about the size of a writing quill, with a blind extremity, and several lateral appendages, which also end in cul-de-sacs. Sometimes the latter are very few; perhaps one or even none. In other instances they may amount in number to ten, or more. Haller has seen seventeen larger, besides smaller ones. Some of these are simple blind appendages; others, particularly near the anterior end of the organ, again branch out. Sometimes the whole vesicula is hisb almost from its very origin; the varieties, indeed, are so numerous, that
two vesicles will hardly be found exactly resembling each other; but these variations are not important. (See Monro de T. Elhus, 3d ed.) This tube, with its appendages, is so convoluted upon itself, that the turnsings being closely connected together by cellular substance, containing numerous muscular ramifications, that the organ, when undisturbed, is four or five times shorter than the unravelled tube; and a section of it in this state makes it appear to be composed of numerous cells, communicating together. This structure accounts to us also for the knotted appearance of the organ on its surface.

The structure of the vesicles is analogous to that of the vas deferens: its sides are not so thick, but they are still dense and strong. The external coat is of a close texture, and whitish colour, covered with cellular substance externally. Nothing of a muscular nature can be discerned here, although the functions of the organ oblige us to admit that it possesses a contractile power. We cannot otherwise account for the expulsion of the contents of the vesicle. The action of the levatores, and which has been ascribed to them in particular, of this expulsion, is certainly inadequate to account for it; as their ordinary daily exertion is attended with no such effect, when the vesicular organ is not present, and these parts are not exerted in their specific manner. We may observe, moreover, that the perineal muscles contract at the moment of ejaculation; but the contents of the vesicles must be conveyed into the urethra in the previous moments. The internal surface of the vesicle is formed by a mucous lining, connected closely to the preceding tunics. Its colour is whitish, and its thickness not considerable. It is continuous with the lining of the urethra.

Its surface is very minutely reticulated, and marked with extremely small divisions, not to mention the larger septa formed by the turnings and folds of the tube and its appendages. It has, moreover, a convex or villous appearance; a similar structure characterizes that enlarged portion of the vas deferens which lies along the edge of the vesicles. The structure of these parts, as well as the junction of the vas deferens and vesicle at an acute angle, has very considerable analogy to the gall-bladder and ductus hepatice. Both have the same reticulated internal surface; the union of the two tubes, and the fupposed course of the contained fluids, are considered to be similar.

Some anatomists have described glands as being contained in the substance of the coats of the vesicle, and secreting the mucous fluid poured into these organs; but the most careful investigation does not lead us to detect any thing glandular, and the secretion is probably performed by the surface of the parts.

We proceed to describe more exactly the canal by which the vesicle and vas deferens communicate with the urethra. The tube of the former assuming a smooth appearance on its internal surface, and rather diminished in size, converging towards its fellow, joins the corresponding vas deferens at a very acute angle; it is still considerably larger than the latter canal. When the parts are directed, and the connecting cellular membrane removed, as in the hepatic and cystic ducts, the junction appears to be effected at a half right angle. The canal formed by this union, and belonging equally to the vesicle and vas deferens, proceeds more directly in the course of the latter, lies in close contact with its fellow, passes between the prostrate and neck of the bladder, and thus arrives at the under surface of that part of the urethra, which runs through the gland. A small elongated eminence is found in this portion of the urinairy canal, composed of its internal coat, broader behind, where it assumes an oval figure. Towards the front it is continued into a long prominence, which is simply a fold of the urethral lining, and disappears in the bulb, ending in one of the long fins, of which several are seen in the urethra, and sometimes bifid, or even radiated at its extremity. It is called exuvet gallinaeum, or verum montanum. The elevations of the lining of the bladder, continued from the ureters, terminate in this eminence. Its oval portion is hollow, and presents a long slit leading into a cul-de-sac, which can be inflated, but which has no communication with the female passages. On each side of the eminence there is a small oblong opening, the termination of the ejaculatory duct, but much narrower than the calibre of that tube, which is suddenly reflected from within outwards, at nearly a right angle, and pours its contents, by this small opening, into the urethra. There is no valvular structure at these orifices.

The slit and cul-de-sac already mentioned have given rise to an opinion, that the two ejaculatoryducts terminated by a common orifice, which is altogether erroneous.

The prostate is a firm glandular body, placed behind the symphysi pubis, in front of the neck of the bladder, and surrounding the commencement of the urethra. In most animals there are two separate glands in this situation, and the expression prostaticus has been erroneously transferred to the human subject. The size and figure of this part have been not unaptly compared to those of a large chesnut. Its broader end is turned towards the bladder, and is divided by a slight fissure into two lateral lobes, the narrower part is situated forwards. It is considerably thicker from side to side, than in the vertical direction. The superior surface corresponds to the arch of the pubis, but is rather behind that part; it is covered by a strong fibrous expansion, descending from the arch, and named the inferior ligament of the bladder. Below, the gland is connected by close cellular adhesions to the upper surface of the rectum, and the contact of these two parts is more extensive in proportion to the size of the gut, which, when much dilated, rises slightly on each side of the prostate, so as to be endangered in the lateral operation of lithotomy. The convex prominent fides are covered by the anterior fibres of the levator ani. The bafiis, or broad posterior part, which is gently concave, embraces the neck of the bladder, and the small anterior ends of the vesicles externales and vasa deferentia. The cellular substance, which connects it here to the bladder, is very dense and firm, and the muscular fibres of the organ are partly interwoven with it. This part presents the grooves already mentioned as dividing the organ into two lateral lobes. In front, the narrower portion of the prostate is lost indefinitely on the membranous part of the urethra, to which it adheres most firmly. The bulk of the urethra, the fat and muscles of the perineum, cover the part to deeply on its anterior aspect, that it can by no means be felt from the surface: on the upper part of the rectum, however, the gland may be distinctly recognized by the finger introduced into the gut, as nothing but the intelle covers it in this situation; and it projects sensibly into the tube when enlarged.

The urethra, immediately at its origin from the bladder, passes through the prostrate from behind forwards, and the membranous is almost coalesced with the sides of the opening in the gland. This passage does not take place at the centre, but nearer to the superior surface, so that a small portion only of the gland is above the urethra, and the chief bulk of it below and at the sides. At the inferior part of the opening, by which the urethra commences, a small portion of the gland projects slightly towards the bladder; and this
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This part is perforated by the female ducts. It has been particularly described by Mr. Home as forming a third lobe of the prostate. See the description of a small lobe of the human prostate gland in the Philos. Transact. 1826, pt. 1.

The external surface of the prostate is covered by a more or less distinct cellular investment, which is the most complete below, and surrounded by numerous vascular ramifications, particularly of the venous kind. For an account of some muscular fibres connected to it, see Compressors.

Its structure is rather obscure; for it does not constitute a simple gland with one excretory cavity, nor is it separable into smaller distinct portions. It is dense and very firm to the feel, appearing homogenous when cut into, of a light brown colour, and on the whole considerably resembling a fibrous mass. Small cavities are scattered through it, and excretory ducts, from 7 or 8, to 12 or 15 in number, continued from these, open into the commencement of the urethra, on each side of the caput gallinacini. From these openings, a white and thickish fluid may be expressed in considerable abundance; it differs essentially in its colour from that contained in the vesicles of the females.

Cowper's glands, are two small glandular masses, so named from the anatomist who particularly described them, and published figures of them; see his Descriptive glansdularum, quadrum super detectarum, &c. 1792. They have also been called the inferior, or smaller prostates, or glandulae accessoriae; they are of a roundish or oval figure, rather flattened, about the size of a pea, placed on each side of the lower end of the bulb of the urethra, and covered by the accelerator muscle. They may be easily demonstrated by cutting through the middle of that muscle, and reflecting it towards each side: they are of a reddish-grey colour, and composed of many little portions, united together by cellular substance. Each of them has a separate excretory duct, about half an inch in length, running obliquely forwards, and opening into the urethra by an aperture, which will admit a hog's bristle. They secrete a mucous fluid, of a reddish colour, which assists in lubricating the lining of the urethra. According to Morgagni, they are sometimes wanting. Haller has always found them, when he sought for them carefully. Cowper describes a third gland as being placed under the pubes in the curve of the urethra; but this has not in general been admitted.

The Penis.—After this description of the organs, which secrete and preserve the seminal fluid, or form other liquors which are added to the produce of the testicles, we proceed to show how this is conveyed to the place of its destination in the female. The urethra is a common passage for the semen and urine, commencing at the bladder, continued along the penis to its extremity, at which it opens, and facilitating, by its connection with this organ, the transmission of the secreting liquor to the organs prepared in the generative parts of the female. The penis is a very leading character in the structure of the male, and is the f&deg;st of enjoyment in the act of copulation. Its form is elongated, and nearly cylindrical; it is placed at the middle and lower part of the abdomen, in front of the lymphatics, and at the bifurcation of the lower limbs. When not erected it is soft and pendent, hanging in front of the scrotum. Its length and size are not constant, even in this condition, in the same individual: for there are numerous degrees between the considerable diminution of bulk produced by the operation of cold, and the swelling, which precedes erection, in any of which the organ may be found according to circumstances; yet there is a middle state, in which it is commonly found, which is not the same in all individuals. In the erected state it is lengthened, enlarged, changed in its direction, and rendered, by the swelling of the urethra, somewhat triangular; a slight curvature may be observed in it at this time, adapted to the direction of the vagina. The increase in the length and size of the penis is always the same in the same individual; and it is more considerable in proportion as the dimensions of the organ in its state of repose are greater: but this is not constant. We may notice a superior and inferior surface, two sides, an anterior and a posterior extremity.

The upper surface, named the dorsal, or back of the penis, is inclined forwards; it is turned towards the abdomen, and becomes posterior in the erected state. A large vein runs along its middle, and sometimes there are two trunks. The inferior surface, turned backwards, is placed against the front of the scrotum; it forms a prominent line from the course of the urethra, and the integuments in this situation have a longitudinal rough mark, called the raphe, continuous with a similar part in the scrotum. On each side of this middle prominence there is a superficial depression, where the urethra is in contact with the corpora cavernosa. The two sides of the penis are rounded. The posterior extremity, called all the root of the penis, is divided into three portions, which will be presently described, viz. the urethra in the middle, and the two corpora cavernosa, one on each side. The anterior extremity presents the glans and prepuce.

The penis is made up of various parts, each of which serves some particular purpose in the functions of the organ, considered as an instrument of reproduction. It. The corpora cavernosa, making up its chief bulk, soft and loofe in the state of repose, are so organized as to become very suddenly increased in size and hardness, in consequence of the operation of certain stimuli. They are the penis is rendered capable of introduction into the female vagina. 2dly. The urethra, by which the secreting liquor is conveyed, is a membranous canal, surrounded by a vascular substance, called corpus spongiosum, which is susceptible of the same change in erection as the corpora cavernosa. 3dly. The glans is a small organ, consisting of a continuation of the corpus spongiosum, covered by a highly organized and acutely sensitive skin, the excitation of which, in the act of coition, determines the discharge of the seminal fluid through the urethra. The penis poises as external cutaneous covering, which is simply contiguous to the glass, but united to the corpora cavernosa and urethra by cellular substance.

The corpora cavernosa, or crura penis, are two nearly cylindrical bodies, of a very firm texture, united laterally in the greatest part of their length, but separated from each other behind, like the branches of the letter Y, and terminating by slender, conical, and pointed extremities. The fixed behind to the rami of the ischii and pubes, advance forwards and inwards, approximating to each other. In front of the crura cavernosa is the corpora cavernosa, in the plural number; but their conformation into one body has induced Sylvester, and some other modern authors, to admit only a single corpus cavernosum, bifurcated behind for a double insertion into the pelvis. The single body, formed by the union of the two crura, to which the bulk and firmness of the penis are almost entirely owing, is flattened above and below, and presents two surfaces, a superior and an inferior, on each of which there is a longitudinal groove, corresponding to the septum, which is within the corpus cavernosum. That of the upper surface is the final, and lodges the great veins of the penis; the inferior, broader and deeper, receives the urethra, to which it is united.
SIDE of the penis, and all the spongy substance removed; the
septum will then be found continuous, by its two edges, with
the fibrous membrane, and composed of strong whitish fibres,
not forming an entire plane, but leaving intervals be-
tween them, at which the two sides of the corpus cavernosum
communicate freely. From this structure the name of septum
peciforme has been derived. The intervals between the
fibres are larger towards the inferior than the superior edge
of the septum. At the part where the two crus meet to-
gether, the septum is complete, it degenerates into separate
fasciculi towards the opposite end of the organ, and the in-
tervals between these are more considerable, as we approach
neater to the front extremity.

The dimensions of the penis are determined in great mea-
sure by the corpus cavernosum; and to this body the organ
owes that firmness in the erected state, which enables it to
fulfil its office in the business of generation.

Each of the crur penis gives attachment at its origin to a
tolerably strong muscle, named the crus penis, probably,
because when a power, capable of producing the effect in-
dicated by that name, was sought for by anatomists, this
muscle seemed to be their only resource. At present the
name appears very ill adapted, since the muscles in ques-
tion obviously draw the penis downwards and backwards,
instead of upwards and against the pubes. Those who ex-
plain the erection of the penis, by the compression of its vein,
should find out a power capable of elevating the organ
against the bone, and of carrying it forwards. It has a ten-
duous origin, below the attachment of the crus penis, from
the inner surface of the tuberity, and radius of the ilium.
It passes forwards, upwards, and a little inwards, and is firmly
implanted in the fibrous membrane of the crus penis.
It will draw the corpus cavernosum downwards, so as to bring
it more nearly into a direction, suitable to the cavity of the
vagina; it has a finial power of shortening the crus penis,
and thereby expressing the blood into the anterior part of the
organ, so as to increase its turgescence. Its origin and
course render it completely incapable of compressing the
large vein of the penis.

The urethra, which, in the female, belongs only to the urin-
ary passages, constitutes moreover in man an essential part
of the generative apparatus. Its length is very considerable,
and its organization very complicated, in consequence of the
latter office. It has connections with almost all the parts
belonging to this apparatus; the ejaculatory and prolate
ducts open into it; it is closely connected to the corpus
caavernosum, and terminated by the glans. In the male sub-
ject it forms a canal extended from the neck of the bladder
to the end of the penis, and giving passage to the urine and
femen. Its length, which varies in different individuals, and
in subjects of different ages, is about nine or ten inches in the
adult. At its origin it penetrates the prolate, passing for-
wards and downwards; it goes under the symphysis pubis,
and then ascends in front of that part, between the two
crura penis, in order to reach the inferior surface of the
corpus cavernosum, and becomes attached to the channel
which we have already described. Being thus united to
the corpus cavernosum, it runs along the whole length of that
body, and follows its direction. Lastly, it traverses the
glans penis, and opens at its extremity, by a vertical slit
with slightly rounded edges of a bright red colour. Hence
the canal forms in its course curvatures resembling those of
the letter S; but this is only when the penis is relaxed; for,
in the erected state, the curvature in front of the pubes,
of which the concavity is turned downwards, is entirely effaced,
and that only remains, which is below the pubes, and of
which the concavity faces upwards.

The
The canal is divided into three portions, distinguished from each other by their organization. The first, of about an inch in length, which passes through the prostate, has received no name; the second, of about equal extent, continued from the prostate to the bulb, is called the membranous portion; the latter corresponds above to the inferior surface of the symphysis pubis, but is about half or three quarters of an inch below the same. Below it is connected by the circular substance to the surface of the rectum, and at the sides, the front edges of the levatores ani are in contact with it. This part of the canal has been called the membranous portion, from a motion that the membrane of the urethra was covered here by no external investment, but in fact it is closely surrounded by a thick stratum of muscular fibres. The most interior of these are circular, and lie close upon the membrane of the urethra. Mr. Wilson has lately described some fibres, arising from a double tendon from the arch of the pubes, depending on each side of the urethra, and united under the canal. (See the Medico-chirurgical Transactions, vol. i.) These fibres are connected in front with the accelerator urine, and behind with the levatores ani. They will comprise the canal when they contract, and, by closing it at the time of emission, will prevent the seminal fluid from being driven backwards by the action of the accelerator.

The third portion of the urethra, including all the rest of the canal, is called the spongy part. It begins by an oblong rounded portion, named the bulb of the urethra. This is situated below the union of the crura penis, between which it makes a remarkable prominence. Below, and on the sides, it is covered by the accelerator urine (see Accelerator), and by Cowper's glands. Together with the two preceding parts of the canal, the bulb forms the first curvature of the urethra, and its sides are strongly connected to the arch of the pubes by means of a fibrous expansion, termed the triangular ligament of the urethra. The latter part possesses the figure, which its name indicates; the base of the triangle is turned downwards, the apex upwards, corresponding to the junction of the oils, pubes, and the sides are attached to the rami of the pubes. It is perforated by the passage of the urethra, which it holds firmly in its relative situation to the bone. In the rest of its extent, the spongy portion of the urethra corresponds above to the channel in the under surface of the corpus cavernosum. Below, it is covered near the bulb by the accelerator, then by the cellular substance of the serotum, and afterwards by the integuments of the penis.

The diameter of the canal is by no means uniform in its whole length. It is large in the middle of the prostate, and smaller where it enters and leaves the gland. The canal is here rather flattened laterally. In the membranous portion it is perfectly circular, but small in its size; and the narrowest portion of the whole canal is just where the bulb and membranous part join. In the bulb it is again considerably enlarged, and after contracting slightly, prefers a cylindrical figure and uniform size to the base of the glans. There it again dilates, and forms what some anatomists have called the fossa navicularis; its anterior opening is somewhat narrower. Mr. Home took the trouble of ascertaining the dimensions of the canal by filling it with wax, and measuring the cast thus formed. The length was nine inches; from the external orifice to the bulb, seven. The membranous portion was 1½ inch, and the prostatic portion of the canal half an inch. The diameter of the cast, at a of an inch from the external orifice, was 9½ths of an inch in a subject of 80 years, and 7½ths in one of 30 years; at 1¼ inches from the external orifice 7½ths; at the bulb of the urethra 12½ths; in the membranous part, immediately adjoining the bulb, 7½ths; in the middle of the prostate 11½ths; at the neck of the bladder 9½ths. Home on Strictures, vol. i. p. 24, and 25.

The situation of the eminence, on which the ejaculatory ducts open, called the vesicostomum, in the prostatic part of the urethra, and its figure, have been already noticed; as well as the openings of the prostatic ducts in the same part of the canal. In the rest of its extent, the internal surface of the canal possesses a reddish colour. In the membranous and spongy portions, longitudinal folds are observable, disappearing on extension. These are not seen in the prostatic, nor at the glans, because the firm texture of the parts which adhere very closely to the mucous membrane, forms which are constantly smooth. Hence the diameter of these parts is nearly uniform at all times. The sides of the canal exhibit openings of numerous small oblique ducts, frequently named after Morgagni. These are only seen in that part of the urethra which is in front of the bulb, and are sometimes called lacunae; their number and size vary in different subjects. They run from behind forwards, and terminate by simple oblique orifices. They are always very numerous about the fossa navicularis, from which some have explained the circumstance of this part being particularly affected in gonorrhœa. They consist of short canals, formed in the membranous fibres of the urethra, lined by a continuation of the internal membrane of this canal, and about large enough to admit a large hog's bristle. They are of various lengths, but commonly about a quarter of an inch. Sometimes several smaller join into one larger duct. If carefully examined, their whole number will not be found less than 60 or 70. No glandular apparatus can be differentiated connected with them. In these tubes the mucous fluid is secreted, by which the surface of the urethra is lined, and defended from the action of the urine. Where these lacunæ do not exist, as in the bulb, membranous portion and prostatic, a protecting fluid is furnished from other sources, as Cowper's glands and the prostate. The fluid of the lacunæ seems to be a clear viscid secretion, similar in appearance and tenacity to the white of egg. In this form it can be expressed from the openings on the surface of the urethra. Under various circumstances of disease it is increased in quantity, and variously altered from its natural properties, as in gonorrhœa and gleet, and in stricture. In some of these instances, it is a clear, transparent, viscid fluid, being the natural secretion in a more abundant form.

The sides of the urethra are differently organized in different parts; it is lined indeed throughout by a mucous membrane, but this is covered externally by very different structures. Where the canal is passing through the prostate, the sides are formed merely by the mucous membrane, closely united to the gland by a dense cellular texture. The firm substance of the prostate is intimately connected with the canal, and, as it is placed in the bend of the urethra, is particularly liable to injury in the employment of the catheter. Even here the membrane is covered by a dense cellular texture, continued from the prostatic, and by the muscular fibres already described. In the spongy portion of the urethra, the sides of the canal are covered by a substance of peculiar organization, analogous in its effects to that which fills the corpora cavernosa penis. This is called corpus cavernosum urethrae, or corpus cavernosum.
crum penis and below the canal of the urethra, sometimes bearing a slight appearance of furrows through the two lateral parts by a middle line, and terminating behind by a rounded end. The bulb corresponds only to the inferior surface of the urethra; but a thinner layer of the corpora cavernosa, continued from the bulb, covers the urethra on all sides in front of that body to the end of the canal. Here it is again increased in quantity, and reflected over the anterior extremity of the corpus cavernosum penis, to form the glans. The spongy fibres surround the urethra uniformly on all sides. It is closely connected to the corpus cavernosum above by cellular substance, and by vessels which are seen when the urethra is detached from its channel; below and on the sides it is covered by a cellular sheath, common to it with the corpus cavernosum penis. The external surface of the corpus spongiosum consists of a thin but compact fibrous layer; and the interval between this and the mucous membrane seems to be filled by a very fine cellular net-work, the cells of which contain venous blood. The tenacity of the external layer occasions the part to possess a livid colour, as the time is different. This net-work is covered in the glans by a highly organized species of skin, through which the colour of the venous blood is not discernible. The corpus spongiosum does not consist, according to the common opinion, of a cellular texture; but it is made up of very small and repeatedly convoluted veins, as may be ascertained distinctly enough by inspecting attentively the surface of it, when successfully injected: this structure is more evident in some animals, as particularly in the dog.

The bulk of the corpus spongiosum depends on the quantity of blood which it contains; and this part admits of the same distinction, as the spongy substance of the corpora cavernosa penis, and for the same purposes. Air, impelled into any part, finds its way readily over the whole extent of the substance, and the same circumstance may be observed of injection. It may be readily injected from the large vein at the back of the penis; but the valves sometimes prevent the success of this attempt.

The canal of the urethra is lined by a mucous membrane, continuous with the lining of the bladder at one extremity, and with the cutaneous covering of the glans at the other, and sending prolongations into the mucous linings of Morgagni, the ducts of Cowper's glands, the ejaculatory ducts, and those of the prostate. Its surface is perfectly smooth, excepting the longitudinal wrinkles which are effaced by extension. The colour is a bright red at the external orifice, and in the fossula navicularis; in other parts it appears pale, when the blood has been expressed from the corpus spongiosum. But the injection of coloured fluids proves that it receives every where an abundant supply of blood-vessels. Its substance is very thin, and the opinion of its being covered by a continuation of the epidermis does not seem to be at all well-founded, as there is a well marked line of separation at the glans, and no cuticle can be shown in the canal. The external surface is rough and cellular for its connection to surrounding parts. No appearance of muscular structure can be discerned in any part of the membrane. The introduction of an instrument shows this membrane to possess acute sensibility; and the repetition of the practice evokes the force of habit in blunting such feelings. The first time of passing a bougie or sound is sometimes attended with fainting, and almost always with sharp pain, but after a few times, no unpleasant sensation is excited. The passage of the urine is attended ordinarily with no sensation; but this becomes most keenly painful when the membrane is inflamed. It has been much disputed whether or not this canal possesses a contractile power in its own living. The phenomena are strongly in favour of the affirmative, although no muscular fibres have been demonstrated. The temporary obstruction to the flow of urine, under circumstances of distress, and the sudden emission of this incontinence, can hardly be explained without allowing a contractile force to the membrane. The emission of urine from the canal is another phenomenon of the same kind. That the trumpet is extensible, and that it returns again to its original size, improved by the passage of instruments. Haller states that external stimulants will cause it to contract.

The glans is the body surmounting the anterior and upper part of the corpus cavernosum penis, and forming the front extremity of the organ, of which it augments the length in a trivial degree. It has the form of a cone, slightly flattened from before backwards, with its base obviously truncated. Its apex presents the aperture of the urethra already described. Below this, is placed the frenum connecting it to the pre-pucce; and on each side of this fold it fuses into a small convex protuberance (colliculi glandis). This part is called by Haller "fensus acernini fede." The glans cannot be laid to extend below the urethra, as that part belongs to the corpus spongiosum. Since the basis is obliquely truncated, the depth of the organ is very incon siderable at the two convexities already named; but it is much more considerable above, where it is produced over the corpus cavernosum, and terminated by a thick rising edge of a semi-lunar outline, with the convexity turned backwards, called the corona glandis. This margin, sufficiently thick and prominent to elevate the integuments, and cause a perceptible rising externally, forms the front boundary of a cul-de-sac, or gutter, caused by the reflection of the inner membrane of the prepuce over the glans. Below, the corona glandis is interrupted by a small groove, which extends to the orifice of the urethra, and gives attachment to the fold which forms the frenum. In some subjects this groove is hardly perceptible. The colliculi glandis are continuous below with the corpus spongiosum; the basis of the glans is hollowed out, and the anterior extremity of the corpus cavernosum penis is received into the concavity. In consequence of this structure, although the glans appears to be an inch or more in length, it makes very little addition to the length of the penis.

The substance of the organ consists of a spongy matter similar to and continuous from that of the urethra. Air or injected fluids pass readily from one into the other. This matter is made up, as in the urethra, of convoluted veins, and it admits of the same changes of laxity and erection from the same causes. Sometimes there is an appearance as if the corpus spongiosum urethrae and the glans were separated from each other by a septum. The substance of the glans is always more dense, and contains less blood than that of the urethra. The surface of the organ is covered by a very vascular and delicate production of the integuments, continuous towards the apex of the glans with the mucous lining of the urethra, and at its basis with the inner layer of the prepuce. This covering is very thin, and smooth and soft to the touch. Its external surface is composed of a delicate epidermis; this is succeeded by a layer of the true skin, of a very soft and delicate structure, covered with numerous small villous processes, which are most distinctly seen about the corona glandis. The most favourable method of observing these villi is to plunge the part in boiling water, which separates the cuticular covering; they are then visible in vain numbers over the whole surface, giving it an irregularity in its appearance. This circumstance in the structure of the glans was first demonstrated by Albinus (Annot. Academ. Lib. iii.) and is admitted by Ruych and Winflow, although
although some anatomists have questioned it, probably be-cause the demonstration is rather difficult. That the nerves of the organ are contained in these papilles, as they are in the tongue, and that the exquisite sensibility of the glan-des, from this organization, is rather matter of probable conjecture, than the result of direct proof. The blood-vein-els of this cutaneous production are numerous, so that a general redness is produced by minute injections. The op-posed surfaces of the glans and prepuce are fringed over with a white, friable, and mucous substance, of a very pecu-lar colour, moistening the parts and preventing the efflux which might otherwise follow their mutual attrition. In animals there are manifest glands to secrete this substance, and an apparatus of glandular structure defined to the same office has been described in man. This kind of febaceous matter is formed in other situations of the body by peculiar glandular organs, as in the eyelids by the Meibomian glands; and the notion that it is deposited by the urine, which is con-trary to all observation, and to every thing we know of the properties of that fluid, would be immediately overturned by the fact, that a similar deposition occurs under the prepuce in the female, where the urine could not form it. Although in many subjects no glands can be seen, they are occasionally obvious enough, and are now universally admitted, under the name of glands of the glans. Morgagni, in his Adversaria, has given a very particular de-scription of them, and Haller confirms his statements. They are hardish, white, and very small bodies, particularly ob-servable about the corona glandis, and in the channel behind that part, where the prepuce is reflected. Morgagni also mentions them near the frenum in the prepuce. "I have seen," says Haller, "five rows of them in the corona, but their number diminished towards the frenum, so that no more than two rows could be seen." They can be observed most advantageously when the cuticle has been removed. That the orifices of these bodies can be seen, and their sebaceous contents squeezed out, is not so clearly ascertained; but both these facts are affected by competent witnesses. They may be rendered more evident when enlarged in dis-ease; and might be mistaken for venereal pimples, if their symmetrical arrangement did not throw light on the appearance. That the matter secreted by these glands accumulates under the foreskin, in the form of a white, soft, and greasy sub-stance, where the necessary attentions to personal cleanliness are neglected, and that, in hot weather, it may become acid and irritating, so as to produce excoriation and even ulceration, are well known facts. The inhabitants of warm cli-mates are chiefly exposed to these inconveniences, and the most important advantage of circumcision consists in its eli-viating such accumulations. Hence we know that Christians, living under the burning sun of Senegal, submit to this operation, and that uncircumcised Egyptians, living in the Eail, very frequently experience the ill effects arising from the source just alluded to. For this reason Gibbon de Cau-lace, a celebrated surgeon of his time, about the middle of the fourteenth century, observed that circumcision was use-ful to many others besides Jews and Saracens: "propter quod non congregans forditates in radio balnei, et ex tempore, et fecon-dent ipsum." Cirurgius, tr. vi. docir. i. p. m. iii. The glans penis polishes a very exquisite sensibility, particu-larly near the corona where it is most plustly by the pre-puce; this feeling is only observed on certain occasions, and is the source of that physical sensation experienced at the expulsion of the seminal fluid. It swells and becomes firm in the act of erection, as well as the rest of the penis. The cutaneous covering of the penis is continuous, at one end, with that of the frenum and pubes, and at the other with the prepuce. It is thin, furnished with numerous febaceous glands, particularly at the under surface, and marked in that situation by a rough line, called the raphis, running along the middle of the organ, and continued with a similar one on the frenum. It is darker coloured than the integu-ments in general, and has a few hairs towards the root of the organ. The cellular texture connecting the skin to the penis is very loose, and contains no fat except close to the pubes; hence the skin adapts itself with the greatest facility to the varying bulk of the organ, falling into wrinkles in the everted condition. It is continuous with the cellular substance of the frenum, glans, and pubes, and air passes readily between them. Towards the surface of the corpus cavernosum it becomes more dense, and assumes the form of a regular membranous covering; it is more and more loose towards the surface, and has, when inflated, a cottony appearance. The supraperineal ligament of the penis is placed at the root of the organ, which unites to the skin of the pubis. It consists of a dense, cellular, elongated, and flattened band, proceed-ing from the front of the skin of the pubis, running along the cellular tissue of the organ, and expanded under the skin. Its limits and figure are not very determined, and the knife of the dissecteur often influences its size and appearance.

The prepuce or foreskin is a loose fold of the cutaneous covering of the penis, continued over the glans, without adhering to it, and affording a more complete covering to the extremity of the penis. Its length varies in different individuals; sometimes it is produced considerably in front of the glans, and its opening is then generally small. Its ex-ternal surface offers the same structure and appearance as the integuments covering the body of the penis, and is smooth or wrinkled, according to the state of the organ. The inner surface, much softer to the touch, is in contact with the glans, to which it has a membranous attachment below, termed the frenum. The latter is continuous, on one side, with the internal membrane of the prepuce, and fixed, on the other, to the small longitudinal groove which we have described in the under part of the glans; and it ends in this situation by a prominent line fixed to the very opening of the urethra. The frenum limits the extent to which the retroc-ision of the prepuce can be carried; but allows the organ either to be brought sufficiently forwards to cover the whole glans, or to be carried backwards far enough to expose its whole surface. In the latter state the frenum is on the stretch, and, s the prepuce is moved forcibly in this direction, it may even be torn, as is colritio; this accident is particularly likely to occur, if the shortness of the fold allows only a par-tial exposure of the glans. Such a disposition of parts rendering the act of copulation painful, might require a sec-tion of the frenum. The base of the prepuce is attached on the inside, to the base of the glans, behind which it is reflected so as to line the small channel already described in this situation. Its apex forms a large round opening, of a sufficient magnitude, in general, to allow the part to be drawn entirely back behind the glans; and, even where it is more contracted, much larger than the orifice of the urethra. In some cases its opening is so small as not to allow the retrocision of the organ, and even to obstruct the flow of urine: this constitutes phimosis; in others, it can be withdrawn, but the tightness is so great that it may not be possible to reduce it; that is termed paraphimosis. It has been ascribed to some races in the East that the prepuce is unusually long, and that this structure particularly favours the accumulation of the matter secreted by the glandular odoriferous; so that circumcision has been more especially necessary on that ac-count.
The integuments of the penis, having arrived at the base of the glans, are continued forwards to its apex, as far as the opening of the prepuce. There they acquire a different organization, are folded back in a contrary direction, and terminate by a firm attachment round the base of the glans. The two layers, of which the exterior does not differ from the skin of the penis, except in being thinner, are connected by a stratum of very loose cellular substance, perfectly free from fat. The laxity of this cellular matter is so considerable, that, when the prepuce is withdrawn as far as possible, the two component layers are no longer in contact, but separated completely. The surfaces, by which they before adhered, are now applied to the corpora cavernosa, and the integuments of the penis are withdrawn towards the pubes. The prepuce seems designed to protect the glans, and defend it from the effects of contact, and rubbing against external objects. Yet it is not essential to the functions of the organ, that it should perform such a covering, as the destruction of it by circumcision or disease proves. The covering of the glans becomes afterwards thicker and harder, but the peculiar sensibility, excited in the performance of the generative functions, does not seem to be diminished.

The arteries of the male generative organs are chiefly furnished by the trunk of the pudendal; but the prolate and vesicule feminales receive branches also from the vesical arteries. The integuments of the external parts have branches from the perineal artery, and from the vellums of the thigh. The veins of the penis unite, for the most part, into a large trunk at the middle of the upper surface of the organ, which passes under the symphysis pubis, and opens into a large plexus surrounding the prostate and neck of the bladder. These end partly in the hypogastric veins, and partly in the inferior mesenteric. Besides these there are superficial veins in the prepuce and penis, terminating in the saphena and femoral vein. The lymphatics of the penis are divided into superficial and deep-seated. The former arise from the prepuce and integuments, and go to the superficial inguinal glands. The latter, arising from the urethra and corpus cavernosum, enter the pelvis in company with the branches of the pudendal artery, and join the hypogastric plexus. The nerves of the penis are of considerable force, and are derived principally from the 2d, 3d, and 4th sacral pairs.

Development of the Male Generative Organs.—As the function of generation does not commence until a considerable period after birth, the development of its organs in the human subject follows a law derived from this circumstance. They undergo no remarkable change from birth till the age of puberty, at which time the growth of the body is carried on in them with great activity. But they may be observed at an early period in the foetus, where, without having any remarkable advancement over other parts, they are considered as advanced, as if nature, in throwing out the organization, had wished to mark a decisive in the differentiating sexual traits.

In the infant state, we shall describe merely the condition of the teills and spermatic cord, as these are the only parts differing essentially at that time from the flin to which they are found in the newly born child. The size of the generative apparatus undergoes no remarkable changes, until the time of birth, and we shall therefore not notice them until that time.

There is no part in the body which undergoes so remarkable a change in its situation as the testicle; and, if it be interrupted in this process, a particular disease is very commonly occasioned. This organ, which, at its first formation, lies in the abdominal cavity at the inferior margin of the kidney, surrounded by the intestines, passes in the advanced periods of utero-gestation into the ferotum, and, as the canal through which it descended is shut up, never regains its original situation. At the time of birth, or very soon after, man and most other mammals have both testicles in the ferotum. This remarkable change was first noticed and described about the middle of the last century, when many celebrated anatomists turned their attention to it, insomuch that it is difficult to determine with whom the credit of being the first describer rests. The peculiar kind of rupture, called hernia congenita, which takes place when the defect of the testis is not accomplished in the regular manner, was the circumstance which principally led to the discovery, and more minute investigation of the facts. When surgeons began to reason on the causes and forms of ruptures, and the structure of the hernial sac, they naturally turned their attention towards these parts, and soon discovered that kind of the complaint in which the parts occupy the canal formed by the defect of the testis, and to which the name of congenital was given, because the state of parts having its occurrence commonly exists at the time of birth. The examination of the origin and peculiarities of this affection, led to a complete elucidation of the whole affair, in a series of excellent publications.

Reneaulme de la Garaune, a French surgeon, who wrote a treatise on ruptures in 1726, has the first hint on the subject; he speaks of the intestines and omentum escaping through the same canal at which the testis has puffed out. Among the numerous claims, which the great Swiss physiologist Pecquet, to the gratitude and respect of all medical men, is that of having given the first clear account of this matter. Indeed, there is hardly any part of the subject which has not been discussed and explained in the writings of this great man; and, as the observation of La Garaune is a single and indirect hint, we must allude the honour of the discovery entirely to Haller. (See Commerc. litterar. Norimberg. 1733, p. 197; 1737, p. 3. Programma, hernia- rum observationes aliquot. Goetting, 1730. Opuscula pathologica, Lauffame, 1755.) Soon after these publications, the subject was taken up in England by the Hunters. Dr. W. H. according to his brother's statement, had found both teills lying in the abdomen in a full-born child of seven or eight months, some years before the publication of Haller's "Opuscula Pathologica," and could not explain the matter to his satisfaction. Mr. J. Hunter published a very full and to his satisfaction of the origin of the hernial kind of its change in the testis. (See Medical Commentaries, p. 1. Lond. 1762, cap. ix.) About the same time the observations of Mr. Pott were made public. The vast practical opportunities enjoyed by this gentleman enabled him to explain all the pathological circumstances connected with the defect of the testis; his knowledge of the anatomy was probably derived from the sources already pointed out. (See account of a peculiar kind of rupture frequently attendant upon young born children, and sometimes met with in adults, London, 1765. Tentam on the Hydrocele, sect. 3. p. 12. Chirurgical observations and cases relative to ruptures, sect. 2.) Camper, who united so successfully anatomical and surgical pursuits, investigated this matter with considerable attention, and gave the results of his labours to the public in the Haarlem Transact, v. 6 and 7. The works of Neubarr and Lubitz are not to be omitted in this enumeration; that of the former is entitled, "De tumulis vaginibus testis et funiculi spermatici." Gieffel, 1750. The dissection of the latter, "De hernia congenita, inequa intestinum in contactu testis eff," Argenterat 1771, contains a very excellent and complete account of the whole matter, both in an anatomical
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et and surgical point of view. In addition to these we have to notice, as containing good descriptions and useful information, the following more modern works. Girard's Appendix adjecta tabulis polliumias Santorini. Palletra nova gubernaculi testis Hunterianei et tumici vaginale anatomiae descriptio. Mediolani, 1777. Brugnione del testis in facti positio, &c. Wehrberg observationes anatomicae de testiculis, &c. in the Göttingen commentaries for 1778. Vizq d'Azy recherches sur la structure et la position des testicules, &c. in the Mémoires de l'Acad. des Sciences, année 1780. Martin commentarius de hernia congenitae ortus, &c. in the Nova Acta Reg. Scien. Upsal. v. 3. Sandifort icones herniae congenitae, Lugd. Bat. 1781, 4to.

Until the approach of birth, the testes of the fetus are lodged within the cavity of the abdomen; and may therefore be reckoned among the abdominal viscera. They are situated immediately below the kidneys, on the fore-part of the psoas muscles, and by the side of the rectum, where this intestine is passing down into the cavity of the pelvis; for in the fetus, the rectum, which is much larger in proportion to the capacity of the pelvis, than in the full-grown subject, lies before the lumbar vertebrae, as well as before the sacrum. Indeed the calf is nearly the same with regard to all the contents of the pelvis; that is, their situation is much higher in the fetus than in the adult; the tympanum of the colon, part of the rectum, the greatest part of the bladder, the fundus uteri, the Fallopian tubes, &c. being placed in the fetus above the hollow of the pelvis, in the common or great abdominal cavity. At this time the figure of the gland is much the same as in the adult, and its position is the same as when it is in the ferotum, that is, one end is placed upwards, the other downwards; one flat side is to the right, the other to the left; and one edge is turned backwards, the other forwards. But as the testis is less firmly connected to the surrounding parts, while it is in the joints, its position may vary a little. The most natural seems to be when the anterior edge is turned directly forwards; but the leat touch will throw that either to the right side, or to the left, and then the flat side will be turned forwards. It is attached to the psoas muscle along its posterior edge, except just at its upper extremity. This attachment is formed by the peritoneum, which covers the testis, and gives it a smooth surface, in the same manner as it envelopes the other loose abdominal viscera. The epididymis lies along the outer and posterior edge of the organ, in the same relative position, which it occupies at a more advanced age. This part is larger in proportion, and adheres behind to the psoas. When the fetus is very young, the adhesion of the testis and epididymis to the psoas is very narrow, the part is consequently more loose and prominent. As its age advances, the adhesion becomes broader and tighter. The blood-veeils, like those of molt parts of the body, commonly arise from the nearest large trunks; ven. from the aorta and cava, or from the emialgents. The nerves too come from the nearest source, that is, from the abdominal plexuses of the intercostal. In respect, therefore, to its supply of nerves and of veiiffs, this organ may be reckoned an abdominal viscera; and this circumstance of its peculiar situation before birth accounts for its being supplied afterwards from so remote a source.

The vas deferens, instead of running upwards from the lower end of the testis, as it does at a more advanced period of life, goes downwards and inwards in its whole course; it continues, indeed, in the direction of the epididymis. It turns iowards from the lower end of that organ, behind the upper extremity of the gubernaculum, which we shall de-
It will be plainly seen to be a continuation of the peritoneum; the testis and epididymis will be seen at the lower part of it; and the spermatic vessels and vas deferens may be observed, covered by the posterior part of the bag, in their whole course from the groin to the testis.

Before the testis has quitted the abdomen, the scrotum is small and corrugated, and contains nothing but cellular substance. This is loose, and yielding near the ring, but more dense and close below. Some have described a pouch of peritoneum passing through the ring, and therefore contained in the scrotum, previously to the descent of the testis; but this is not generally correct. There is no such pouch while the gland remains near the kidney. The parts about the ring are surrounded by such a loose and cellular texture, that, by drawing the gubernaculums downwards, the peritoneum is carried with it as to represent a small cul-de-sac.

The testis, too, after it has passed the ring, may be drawn up again into the abdominal cavity, in consequence of this laxity of the surrounding fibres.

In the human body then, when the testis has recently come down, it is contained in a membranous bag, formed of an elongation of the peritoneum, and communicating with the abdomen by means of a narrow process, advancing in front of the spermatic cord. The parts remain in this condition throughout life in the quadruped, but in man the communication between the membranous covering of the testis and the abdomen is soon cut off. The upper end of the canal is closed first, and the aperture is obliterated so speedily, that there is seldom any communication in a child born at its full time. The process of contraction is continued downwards, along the cord, to the upper end of the testis, at which it closes. Thus the tunica vaginalis testis, which was in the first instance a production of peritoneum, becomes entirely separated from that membrane; the peritoneal covering of the gland is the reflected tunica vaginalis.

"This contraction and obliteration of the passage seems," says Mr. Hunter, "to be a peculiar operation of nature, depending upon steady and uniform principles, and not the consequence of inflammation, or of anything that is accidental; and, therefore, if it is not accomplished at the proper time, the difficulty of bringing about a union of the parts is much greater: as in children who have had the face kept open by a turn of the intestine falling down into the scrotum immediately after birth. "The closing of the mouth and of the neck of the face, is peculiar to the human species; and we must suppose the first cause to be the prevention of ruptures, to which men are so much more liable than beasts, from their erect state of body." We feel some hesitation in admitting this reasoning as to the cause of obliteration: at all events, if we should acknowledge it, the frequent occurrence of ruptures must prove that nature accomplishes her end very imperfectly. "What!" says the same physiologist, "is the immediate cause of the descent of the testis from the loins to the scrotum? It is evident that it cannot be the compressed force of respiration, because commonly the testis is in the scrotum before the child has breathed; that is, the effect has been produced before the suppurative cancele has existed. Is the testis pulled down by the cremaster muscle? I can hardly suppose that it is. Because, if that were the case, I see no reason why it should not take place in the hedge-hog, as well as in other quadrupeds; and if the mammalian testis had this power, it could not bring it lower than the ring of the muscle."

The proceed which we have now described, is liable to some variations. In some individuals, the neck of the peritoneal elongation is not obliterated, so that the tunica vaginalis...
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radii communicates permanently with the abdomen, as in quadrupeds. Hence, we sometimes see hydromes particularly in children, when the fluid can be made to pass into the belly by puncture. If a rupture occurs in such individuals, it is contained, together with the testes, in the tunica vaginalis. Sometimes the testes do not descend before birth; when they pass down after this time, a part of the intestine or omentum is liable to descend with them, and is of course contained in the tunica vaginalis. One or both may be retained in the abdomen beyond the usual period. When the natural process has not begun, or has been interrupted before birth, it becomes afterwards very uncertain when the descent will be completed. It takes place most frequently between the years of two and ten, while the person is young and growing, being seldom delayed beyond the age of puberty. However, one or both of these glands may be retained in the abdomen through life. In this case, Mr. Hunter conceives that there is some imperfection in their formation. "I am inclined," says he, "to suspect that the fault originates in the testicles themselves." And again, "when both testicles remain in the belly, I believe that they are exceedingly imperfect, and incapable of performing the natural functions of those organs; and this imperfection prevents the disposition for their descent taking place." The writer of this article has seen two cases, where one testis had remained in the abdomen, and where the circumstances ascertained by anatomical examination corroborated the opinion of Mr. Hunter. In one, the body of the gland was not more than half its usual size: the epididymis, which was very imperfect, ran for about an inch behind the face of a horn, which had occurred in this individual, and did not join the body of the testis. The other case presented exactly the same appearances. A third instance has come to his knowledge, in which both of the testes remained in the abdomen, but were formed apparently perfect in their structure. In this case, it was underflood, that the ordinary functions of the glands had been executed in a healthy manner during the person's life.

The times, at which the changes in position already described take place, are most accurately noted by Viriiberg in the memoir above quoted. He gives a tabular arrangement of his observations on this subject, deduced from very numerous examinations, of which the following account contains the chief particulars. "At the age of one month and three weeks, the testes were close to the kidneys, with the smallkilf possible interval; the scrotum loose and edematous. At two months, the testes, exceedingly small, touched the kidneys; the gubernaculum very long, and the scrotum wrinkled and rather hard. Two months and one week, testicles very near the kidneys; spermatic vessels discernible through the peritoneum, like very fine threads; gubernaculum distinct. Three months, testes about the size of hemp-seeds, placed rather further from the kidneys, and at the edge of the pelvic. Three months one week and a half, the scrotum extremely small, and indeed fearfully deformable, so that the penis hung from a slight prominence of the skin. The small intestines coiled together in the upper part of the abdomen, far from the testes. The latter had descended further on the side of the pelvis; the gubernaculum very short. Three months and three weeks, the scrotum small and contracted: the testes more than three lines below the kidneys. Four months, the scrotum very small: the testes deeply placed, with their inferior ends touching the rings. A distinct canal of peritoneum on the left side, leading from the cavity of the abdomen into the scrotum, although the gubernaculum was not yet inverted. Four months and one week, the testes very high, nearly touching the kidneys; the gubernaculum long; no canal passing through the ring, which was perfectly closed. Eight months and two weeks, the testes near the ring, with a canal of peritoneum on each side, passing to the bottom of the scrotum. Five months and two weeks, both testes in the rings; so that they could not be seen until pressed towards the abdomen, when they appeared readily. Eight months, scrotum well formed, with its surface wrinkled, but empty. The testes had passed the ring, but remained in the neighbourhood of the groin; the right could be easily pushed back into the abdomen through the process of peritoneum, which was still open; but the left could not, as the communication was already closed. Nine months, testes in the bottom of the scrotum; the canal of communication perfectly closed on the left side; it was flat on the right by a soft cellular substance easily yielding to the probe. Nine months, both canals perfectly closed."

From the foregoing facts, the following conclusions may be drawn: 1st. Before the beginning of the fifth month the testes have not passed the ring on either side; but generally remains near the kidney: so that this situation may be depended on as a proof of the immaturity of a fetus. 2dly. Between the beginning of the fifth, and end of the sixth month, they are generally found about the ring; being in some instances above it, in some within the canal, and in others just below. 3dly. The scrotum in the first months, up to the fifth, is small in proportion to the body, sometimes less than in infants, but always empty; and containing cellular substance instead of the cavity, in which the testis is to be afterwards lodged. A broad and strong fasciculus of fibres (the gubernaculum) is contained in the midst of its cellular substance. 4thly. When the testes have first descended into the scrotum, the canal of peritoneum still opens to the abdomen, so that they can be easily drawn back into the belly, and sink down again. This is generally practicable, in fetuses, between the 7th and 9th months. The ordinary law of nature on this subject is, that the human subject, born at the expiration of the full term of utero-gestation, has both testicles in the scrotum. Haller's contrary statement, "ut rarissime fetus in lucem edamus, cum testiculis scroto inlatus," (Element. Physiol. vol. 7. p. 413.) has been completely disproved by the testimony of subsequent observers. Whether the canal of communication be generally closed before birth, is a point on which authors are not unanimous. According to Viriiberge, with whom Vicq d'Azur agrees, this is commonly the case. But the representation of Camper is somewhat different: this anatomist and Leflau-ó deceive, that the obliteration takes place earlier on the left than on the right side. Of 53 newly born children examined by Camper, 23 had the canal open on both sides, 11 on the right side only, and 5 on the left only. In six it was closed on both sides. In four both testes were contained in the abdomen; and in these only the right. In the excellent memoir of Viriiberge, already referred to, there is a table of 103 births observed by himself, in which the position of the testes was carefully ascertained. The proportion of premature to mature and perfect births was as 9 to 51, or in round numbers 1 to 6. All the children, whose weight did not exceed 5 lbs., came into the world at the beginning of the ninth month, or in the eighth, or even in the seventh month. Three of these had both testes in the scrotum, three in the groins, and three in the abdomen of the children born towards the end of the ninth month, 69 had both testes in the scrotum, 17 one or both in the groin, eight one in the abdomen, and three, whose weights were 5½, 6½, and 7½, both in the abdomen. In the 12 out of these 103 causes, where one or both testes remained in the abdomen, they were observed to descend on the days mentioned below.
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In one instance it passed down on the day of birth; the defect took place in three subjects on the second day, in an equal number on the third, in two on the fifth, and in one on the twenty-fifth. In the remaining individuals, they had not appeared on the fourth and fifth weeks from the time of birth; and as the children then left the hospital, the time of defect was not known. In three instances, the defect was observed to be accompanied with crying and convulsive motions of the limbs. Both testes had passed into the ferotum of one child, born at the end of seven months, and weighing only 34 lbs.; which must be deemed a rare occurrence. They have been seen in the ring in a fuscus of four months. Bichat, Anat. Defcr. t. 5. p. 234.

The colour of the organ, while in the abdomen, is greyish, and its form elongated. The epididymis is considerably larger in proportion than in the adult, and its head lies considerably above the testis: it is more loosely connected to the body of the gland. The circumference of the testis at this time is fuit and pulpy.

The penis, at the time of birth, although small, is well formed, and possesses an elongated prepucce, which completely covers the glans. The integuements of the penis, as well as those of the ferotum, are not distinguished in colour from those of the body in general. The rugae of the ferotum are not yet well marked. There is a small quantity of fat in the ferotum, and the fibrous covering, common to the cord and testis, cannot yet be distinguished. The vesicula feminales, in consequence of the position of the bladder, peculiar to this age, are nearly vertical in their direction, very small and collapsed, and not exhibiting the tubercles on their surface seen in the adult. Internally they contain a mucous fluid.

The corpus cavernosum penis is very short and small, and remarkable for the small proportion of its spongy subfiance, and the trifling quantity of blood which it contains. The latter circumstance is still more striking after a few years, in consequence of the increased thickness of the fibrous membrane: hence, as erection depends principally on the swelling of the spongy part of the corpus cavernosum, the penis of children, when erected in consequence of some sympathetic excitement, is hardly increased in size, and very little in length. The urethra, in the first years of life, is long; and its direction from the bladder to below the symphysis pubis is more oblique than in the adult. These two circumstances, in the formation of the urinary canal, arise from the bladder being situated higher in the abdomen, and from the superior aperture of the pelvis being more flattening. The prepucce is elongated, so as to give the penis a pointed termination. Its opening, always very narrow, may be so small as to prevent the discharge of the urine, or to render it impracticable to denude the glans. The latter circumstance constitutes congenital phimosis. The frenum is narrow and reaches to the opening of the urethra.

No great changes are observed in the organs of generation from the time of birth until puberty. Butted with the general organization of man, and particularly attentive to the bringing to perfection the agents by which he communicates with surrounding objects, to the putting in action the springs of his intellectual powers, nature seems, if we may use the expression, to forget the instruments of reproduction, which continue for a time stationary. If, during this long period, their organs undergo no important revolution, they partake slightly in the general growth. Each of them, considered singly, without increasing in any very marked degree, becomes more perfect in its organization, of which the principal traits may be more easily observed some years after birth. But these changes, which take place very gradually, are trifling when compared with those which happen at puberty.

Changes in the male Organs at the Time of Puberty.—In the two or three years immediately preceding this period, the testes are covered by a flight down, which appears generally before the beard. We may remark also, that its appearance is more constant, and its growth more rapid. In fact, the hair on the generative organs, although it is not completely developed for some years, has gained nearly its full length and thickness, while the beard is still thin and short. At this time, the hairs appear, the skin of the ferotum and penis loses its whiteness, and becomes more or less brown in conformity with the tint which it possesses in other parts of the body. The ferotum, hitherto contracted, becomes longer; the testis is removed to a greater distance from the ring, and the spermatic cord proportionally elongated. The penis becomes larger and longer; the frequent erections occasion the prepuce to appear shorter, and the glans to be a little uncovered. The various layers composing the ferotum are complete at this time. The testis is proportionally larger than the vesicula feminales and penis, as the exercise of the generative functions commences here. The vesicula feminales are still very small, even in a subject of 14 or 15 years. The canal of the urethra, as well as the other parts of the penis, is considerably increased, as may be seen by observing the stream of urine.

In old men the ferotum is generally soft and pendent, and external impressions are no longer able to bring it into the state of corrugation. The cellular subfiance which it contains is frequently the seat of watery effusion. The fibrous covering of the testis and cord is dense, thick, and easily demonstrable. The testis is small, soft, and waffed; but without any remarkable change in its organization: the volume of the epididymis, on the contrary, is equal to what it possesses in the adult. The spermatic cord is rather smaller, unless the veins should be in a dilated state. The vesicula feminales are collapsed, and the protrate becomes hard: the penis is constantly placid.

Physiology of the male Organs of Generation.—We shall describe, in the first place, the secreting fluid, as it appears when expelled from the body in the act of copulation; and shall then distinguish the various parts of this compound liquor. We shall exhibit the facts which have been ascertaincd concerning this interesting subject, just as we treat any other part of physiology: we shall either use such language as shall be intelligible, or pass over in entire silence every thing which relates to the production and development of the new beings, and the continuation of the species.

The fluid expelled from the urethra of a healthy man, under the influence of the venereal act, is white, inclining perhaps slightly to a blueish cast. But it is not homogeneous, as it contains thicker and more opaque mixed with a more thin and semipellucid matter. The latter is more abundant in proportion as the subject is weaker, and the act more frequently repeated. From this difference in the appearance of its component parts it has been sometimes compared to congealed milk. It is of a viscous or glutinous nature, and therefore readily entangles air; hence it becomes frothy if rubbed in a mortar. When first discharged, its consistence is about equal to that of a thick cream; but as it cools, the opaque mucilaginous part becomes transparent, and acquires greater consistence. In about twenty minutes after its emission the whole becomes liquid; at this time, too, it is transparent, having deposited a sediment of a whitish matter, resembling a mass of slender rags. The liquefaction is not owing to the absorption of moisture from the air, for it loses instead of acquiring weight during its exposure to the atmosphere; nor
GENERATION.

The feminal fluid, in its recent state, contains an immense number of animalcula, called sometimes vermiculi spermatici. They have a rounded head, with a gradually tapering tail, not straight, but alternately bent to either side. They are 1000 times smaller than a hair, and 10,000 times more slender than one of the tubuli testes: so that, according to Leeuwenhoek, 216,000 of them would go in a sphere, equal in diameter to the breadth of a hair. Their length has been estimated at 0.244, 4th of an inch. They are found in all quadrupeds, in reptiles, birds, fishes, insects, and even in tellacous animals. Some variations in figure are observed in different animals: but their size is nearly uniform in all. They are no larger in a whale than in a small fish. They are said not to exist in children, nor to be observable after frequent coition, nor in old subjects; but only in healthy and prolific females, so that their presence may perhaps be deemed a criterion of the maturity and perfection of that fluid. The feminal vermiculi were first observed by a German youth, Lewis Hamme. He showed living animals in the human female to Leeuwenhoek in the year 1677. This indefatigable observer immediately employed himself on the subject, and in the same year sent an account of the phenomenon, with drawings of the vermiculi in the dog and rabbit, to the Royal Society at London. (See Phil. Trans. n. 143.) The communication was received with great applause, the facts were flown to King Charles II., and admitted by all. At the same time they were examined and described in France, and, as far as the mere demonstration goes, they were universally admitted in the literary world. Nicolas Hartsoeker claimed the discovery, but not till the year 1678. (Essais de Dioptriques, p. 227.)

It has been alleged that these animalcula are not peculiar to the female, but that they are found in various other animal fluids. Accurate investigation has not substantiated this objection; but, on the contrary, shows that they are peculiar to the femal fluid. Others have denied that they possessed tails; and Buffon, in particular, represents the facts very differently from Leeuwenhoek. (Histoire Nat. Gener. & Partic. t. 2. p. 176 & seq.) His representations being supported by those of Torberville Needham. ( Nouvelles Observations Microscopiques, p. 213.) M. de Buffon observed the fluid from the femal vessels of a dead human body; yet warm. It was full of filaments moving about, and branching into many parts. The filaments swelling burst, and many ovular corpuscula escaped, which still remained attached to the filament, as by a thread: then they oscillated like a pendulum, and during those oscillations the thread extended. The corpuscula, at length detached from the filaments, traversed the most fluid part of the female, along with their filaments, the extreme length of which impressed their motions, and they seemed to him to endeavour to free themselves from it. Having diluted the female with rain water, he more than once observed that each ovular corpuscle had a double motion of oscillation, and of progression. In two or three hours the femal matter acquired greater fluidity, the filaments disappeared; the number of corpuscula increased; the thread contracted; the oscillations relaxed; and the progress motion increased. In five or six hours the ovular corpuscle, having lost the threads, resembled animals more than ever; not only because their quickness in swimming was greater, but because they directed their course to every quarter. In twelve hours the activity of the corpuscula was great; and some revolved upon their axis; others changed the ovular to the globular figure under the observer's eye; some divided atunder, so that one formed two.
At the end of one day the number diminished; and, upon the third, none were to be seen. In other fermen, which seemed to be entirely filamental, the ovular corpuscula did not proceed from the filaments; but these, dividing in two, were metamorphosed into corpuscula. They were embarrased by a thread. The longer it was, the more it impeded their motion; but it gradually contracted, and was at last completely destroyed. The figure of these ovular corpuscula resembled that of those of infections. They swam with a progressive motion, though, at first, the thread occasioned a simple oscillation. He observed similar phenomena in the feminal fluid of other animals. Sometimes the corpuscula altered their figure; sometimes they divided into two. Buffon conceives that they cannot properly be deemed animals, and he forms of them a particular class, under the term of *organic molecules*, which are particles diffe-
milated through all matter, original, incorruptible, animated, and always active. Nor does he hesitate to confide the formation of the animated universe to these molecules. Subsequent researches have not confirmed these opinions of the French naturalist. That the feminal vermiculi have tails is proved by numerous accurate observers, and is particularly supported by the testimony of Haller. (Elem. Physiol. t. 7. p. 521.) It seems questionable whether Buffon ever saw the real femoral vermiculi; for the latter live at most only for a few hours after the discharge of the fluid, while those observed by him remained for some days. And his remarks on the whole seem much more applicable to the microscopic animalcula observed in vegetable infections, as well as in all liquors exposed to the air. This point seems clearly proved by the labours of Spallanzani, who made a vast number of observations on the subject, and fet the whole history of the femoral animalcula in so clear a light, that no doubt can remain on the subject. The general result of his researches tends completely to correct the original remarks of Lecu-
vendoece. (See his Treats on the Nature of Animals and Vegetables. Edinb. 8vo. 1799.) He observes that his experiments on fresh human semen presented him with totally different results from those described by Buffon, but as he could not regard Buffon's statements as purely chimerical, he thought the contradiction might be reconciled by the sup-
position that the French naturalist had described animals of a different kind. "I had remarked," says he, "that there is no part of an animal which, when infusoried, does not give existence to a particular kind of animalcula. They are produced indifferently, by the muscles, brain, nerves, membranes, tendons, veins, and arteries. The same holds good of the blood, serum, milk, chyle, saliva, &c. mixed with water, or even by themselves. I had not yet made experiments upon the human semen for this purpose; but it was most probable, that the putrefaction of this liquid would give existence to particular beings. May not M. de Buffon have confounded this with the feminal vermiculi, and ascribed to the latter the properties and phenomena exhibited by the former? I determined to ascertain this fact by observing what happened successively to the semen, when long preserved in a water-
glass. I made my first experiments on the human feminal fluid. The vermiculi died in three hours and a half, and were precipitated to the bottom of the glass. Upon the fifth day, the feminal fluid began to exude a fætid and disagreeable odour; but I could perceive no animated being: only, upon taking some drops from the bottom of the glass, I observed the dead bodies of the vermiculi apparently very entire. The seventh and eighth days I saw no change, but the factor increased. On the ninth I discovered very minute animalcula, their size nearly equaling that of femoral ver-
iculi; but they had no tail, and greatly resembled most minute spherules. Like animalcula of infusions, they sometimes dropped at little segments of corrupted semen; sometimes their course was very rapid, retrograde, rising and sinking in the fluid; in a word, they poissified every property of infusion animalcula. They were seen in every stratum of the semen; and those at the bottom put in motion the dead bodies of the feminal vermiculi, which were still entire, and remained for some days longer." Two or three successive generations of these animals were observed, as in the case of other animalcula. When the semen was exposed to a greater degree of heat, they appeared at a more early period, even as long as twenty-three hours from the removal of the fluid in the dead body. In one instance they were observed to propagate by a spontaneous transverse division of the body. "These facts sufficiently satisfied me that Buffon had erroneously ascribed to the femoral vermiculi properties belonging only to the animalcula of infusions. Let us, in a few words, collect the circumstances. According to this author, after a certain time, the vermiculi were deprived of their tails. He should have said that the animalcula of infusion came in the place of the vermiculi, which were already dead, and precipitated to the bottom of the liquid. He was arrested by their first appearance; and took them for feminal vermiculi deprived of their tail, which in truth they often very much resemble. When diffigented from the tail, Mr. Buffon adds, they acquire greater activity. This was a necessary consequence of the first mistake. When the infusion animalcula had taken place of the vermi-
culi, their increased agility could not be unobserved, since the animalcula move with much greater quickness than the vermiculi. This erroneous supposition being admitted, Mr. Buffon had to relate, as he has done, the remainder of the phenomenon. He had to speak of the imaginary changes of the vermiculi, of their division, and their diminution, with the more confidence, as his opinions had to be confirmed by a repetition of his experiments, if not upon all, at least upon many species of infusion animalcula in the semen." p. 135—142. The following account of the femoral vermiculi is taken from the work of Spallanzani already quoted, which contains the most complete account of the subject.

When the semen begins to dissolve, if it be examined with a magnifier of small power, the irregular parts seem to be in an indistinct flow agitation, produced by globular cor-

puscula, of which each possesseth a sort of filament, or short appendage, about six times the length of the body. They have two motions; one oscillatory, from right to left, and vice versæ, in which the appendage is curved from one side to the other: the other is progressive, the vermiculæ transporting itself by oscillation. They strike against every obstacle, and when in considerable numbers, make a thousand contor-
tions to elude, at last taking that way where they feel the least resistance. Thus they are in continual motion. In twenty-three minutes the motions of oscillation and pro-
gecession diminished; and in an hour and a half it had lessened to much, that a very small number of corpuscula poissified any power of motion. In general, the progressive motion scales before the oscillatory; so that, at last, the corpusculæ merely bends from right to left, and reciprocally. They continue fixed to the same spot, until the oscillatory motion insensibly dies away. After all motion is gone, the corpusculæ remain entire in the fluid, and then they are bet-
ter few than even when the liquid is diluted with water. Each corpusculæ is not properly globular, but elliptic, and the appendage is not only longer than it appears, but the breadth is not equal throughout like a thread, but increases
as it approaches the body. Water or other fluids rendered them immediately motions. They may be sometimes offered, in the clots of the semen, before they have dissolved, attached by their appendages to the filamentous matter, they struggle to disengage themselves, and then swim about in the fluid. The motion continues much longer when the temperature of the atmosphere is increased: at 36 all motion had ceased in three quarters of an hour; at 49 in two hours; at 59 in three hours and a half; and at 81 they lived for seven or eight hours. The corpuscles were seen in the fluid obtained from the epididymis and testicles of various living and recently dead animals. That they are not formed, according to the sentiment of Buffon, from the filamentous part of the semen, is proved by this: that they are most abundant in the fluid part, and even do not exist at all in the clots, where they are examined in a very recent state, and freed as much as possible from the thinner part of the seminal fluid; while, the latter, at the same time, abounds with them. Nor are they generated, as Needham affirmed, by exposure to air. For Spallanzani saw them in the vaginal numbers, when the time employed in taking the fluid matter from the seminal vessels was warm, to present it to the microscope, did not exceed a second; and they were observed in the same numbers in seminal fluid carried without day by the epididymis of a living ram to the microscope.

Great care and attention are necessary in observing the appendages of these vermiculi, and hence they escaped the notice of Buffon. It is wonderfully slender, and at the same time transparent, so that too strong a light confounds it with the seminal fluid: the slider should be fine and thin, and the drop of fluid vary thin: and a microscope of a single lens is preferable to the compound one.

They live longer in close vessels, than when the semen is exposed to the air: and they also live longer in vacuo. The difference of time at which they die in these different situations amounts even to one, two, or three hours. "These facts prove that the air is noxious to the vermiculi, and the following prove that it is the cause of their being in continual agitation. With the blow-pipe I formed capillary tubes, one end of which Iimmered in recent semen; it ascended the cavity, filling the tube to a certain height. Breaking the tubes near to the part to which it ascended, I preferred this extremity to the blow-pipe, and immediately sealed it hermetically. I did the same to the other end, by which means the seminal fluid was deprived of all communication with the external air. I drew out the tubes, so that the thinnest of the tubes permitted me to see the vermiculi within. The peculiarities presented by the vermiculi in the tubes were very different from those of the rest. All, or at least most of them, had a singular mode of moving. Some had that fort of activity observed in those, which experience the influence of the open air. Others had a continued irregular motion; they changed from quickness to inactivity, and reciprocally. Others stopped entirely after reeling some minutes, resumed their former velocity; besides, they were not observed to run against the solid portions of the semen, but to avoid them by turning aside or retreating. Those peculiarities always succeeded better, and with more uniformity, when the tubes were kept warm. I have before said that the longest period of life, of the human spermatic vermiculi, was seven or eight hours, when exposed to the open air, but this period is greatly prolonged when they are included in tubes. In summer I have succeeded in preserving them two days or more; and in spring and autumn they have lived almost three." P. 156.

Cold, near to that of freezing, renders the vermiculi motionless; but they are recovered by the application of heat.

A temperature of 131° kills them; but the animalcula produced in the semen by putrefaction are destroyed by a temperature of 108°.

To this account of the seminal vermiculi we subjoin the following reflections on them by Boumet, oberving only that we are in a state of the most profound ignorance of all the points alluded to in his questions.

"The vermiculi are, of all the animalcula of liquids, those which have most excited my curiosity; the element in which they live, the place of their abode, their figure, motion, secret properties, all in a word, should interest us in so singular a kind of minute animated beings. How are they found there, how are they propagated, how are they developed, how are they fed, and what is their motion? What becomes of them when the liquid they inhabit is returned by the vehicle, and mixed with the blood? Why do they appear only at the age of puberty; where did they exist before this period? Do they serve no purpose but to people that fluid, where they are so largely scattered? How far are we from being able to answer any of these questions!" Spallanzani’s Facts, p. 179. The reader may also consult, on this subject, W. E. von Glucken über die Samen-nusk infusions-thierchen, Norim. 1778, 4to.

The opinions of Leeuwenhoek concerning these vermiculi; e.g. that they are of different sexes, that they copulate, become impregnated and produce young; and that they are the rudiments of the future beings, to be conveyed by copulation into the body of the mother, and there developed; are destitute of all proof, and completely chimerical.

We have no accurate accounts of the sensible properties, nor any chemical history of the fluid separated in the teftis. When observed in the vas deferens or epididymis of man, after death, it possesses a light-brown or yellowish colour, and approaches in fluidity to water. It may be seen in animals, on cutting into the teftis or epididymis, much thicker, viscous, and of a grey colour. At least it has this appearance in a dog. The whole gland, in a healthy animal, is turgid with this fluid. The contents of the vesiculae deferentis differ in their appearance from the secretion of the tefticles. It is a brownish or yellowish fluid of light colour, semi-transparent, and often containing flakes or corpuscles, so as to vary in consistence in different parts of the bag. Exposure to the air produces no change in its consistence, as it does in the semen. Sometimes the contents of these bags are a clear mucous fluid. Mr. Hunter took the trouble of observing them, in two healthy persons killed suddenly, immediately after death. In one the fluid in the vesicle was of a lighter colour than is usually found in men who have been dead a considerable time; but it was not by any means like the semen either in colour or smell. In the other the contents of the vesicle were of a lightish whey colour, having nothing of the sinell of semen; and in so fluid a state, as to run out on cutting into them." (Obl. on the Animal Economy, p. 28.) Thus it appears that the fluid of these bags differs both from that contained in the teftis, and from the semen emitted in coition; consequently, that they are not mere secretions for the matters separated in the tefticles, but that they add to the secretion of that gland some considerable bulk of fluid, separated by their own vessels. The peculiar organization of their internal surface would have led us to expect this, as it exhibits an arrangement of parts found only where some secretion is performed. The same argument will lead us to assign a similar function to the enlarged portion of the vas deferens lying by the side of the vesiculae semen. The exact nature of the fluid separated in the vesicle
it is not known; nor have we any chemical analysis of it. In many instances it looks like a simple mucus; and there can be very little doubt, that in all cases the contents of these bags conflict chiefly of their own secretions.

The opinion, that the vesiculae perform a particular secretion, was held by Heller: "I have," says he, "no experiments of my own to prove that any thing is separated in those organs, and mixed with the fluid formed in the testes; but, however, that a secretion takes place here as in the gall-bladder." (Tom. Phyol. 7. p. 540.) Galen conceived that the mucus was generated in these parts; and Kiolan, Raych, and Swammerdam, were of opinion that they added something to the seminal fluid. The point has been most clearly proved by Mr. Hunter in a paper contained in his Observations on the Animal Economy, and entitled "Observations on the Glands situated between the Rectum and Bladder, and called Vescicule seminales." His chief argument is derived from the examination of the organs in persons who have lost one of the testicles by accident, or in consequence of disease. It is well known that this loss does not affect the generative powers, and that such individuals retain their sexual appetites and the faculty of procreation. We may consequently presume that they have afterwards had connection with women, and consequently had the action of emission, which must have emptied the vesicula of the castrated side, if it had contained semen; and, as the removal of the testis must have cut off all source of supply from that quarter, it should be found empty after death, on the supposition of its contents being ordinarily derived from the testes. Such cases afford an opportunity of making comparative observations between the vesicula of the perfect and that of the imperfect side.

"A man," says Mr. H., "who was under my care in St. George's hospital for a venereal complaint, died there, and was discovered to have lost his right testicle. From the cicatrix being hardly observable, it must have been removed some considerable time before his death; and the complaint, for which he was received into the hospital, is a convincing proof that he had connection with woman after that period. I opened the body in the presence of Mr. Hodges, the house surgeon, and several of the pupils of the hospital. Upon dissecting out, and examining the contents of the pelvis, and the structures surrounding the duct on the right side, I found that the vesicula deferens of the right side was smaller and firmer in its texture than the other, especially at that end next to the abdominal ring, near to the part that had been cut through in the operation. The cellular membrane surrounding the duct on the right side was not so loose as on the left; neither were the vessels which ramified on the right vesicula so full of blood. But upon opening the vesiculae, both appeared to be filled with a kind of mucus similar to that which is found in other dead bodies; and the vesicula on the right side was rather larger than that on the left. Whatever, therefore, may be the real use of these vesiculae, we have a proof from this dissection, that in the human subject they do not contain the semen.

"In a man who died in St. George's hospital with a very large bubonoccele, the testicle of that side was discovered to have shrunk lost its natural texture from the preface of the seminal fluid; and upon examining the testicle, with attention, there was no appearance of vesicula deferens till we came near the bladder, where it was a mottled as large as a nail. The vesicula of that side was found to be full as the other, and to contain the same kind of mucus.

"I examined the left testicle of a Frenchman on account of its being dissected. He was a married man, and died about a year afterwards, having been extremely ill for several months before his death. On examining the body, the vesiculae were both found nearly full; more especially that of the left side, which I suppose might be accidental. But upon examining the vesiculae of the left side, where it has along the side of this bag, and where it has a similar structure with the vesicula, I found it filled with the same kind of mucus; and this, I believe, is always the case, whether the testicle has been removed or not.

"A young man, a coachman, who had a disease in his left testicle, had it removed, at St. George's hospital, by Mr. Walker, in August 1785; and in February 1786 he returned again to the hospital, on account of uncommon pains all over him, and for which he requested to be put into the warm bath. But as he was going from the ward to the bath, he dropped down, and died almost immediately. The body was dissected, with a view to discover the cause of his death, and upon an examination of the vesiculae, the bag of the left side was as full as that on the right, and the contents in both were exactly similar.

"In dissecting a male subject, in the year 1755, for a side view of the contents of the pelvis, I found a bag on the left side, lying contiguous to the peritoneum, just on the side of the pelvic, where the internal lute vessels divide above the angle of reflection of the peritoneum at the union of the bladder and rectum. The left vesiculae was seen passing on to the bag; and, what is very singular, that of the right or opposite side crossed the bladder near its union with the rectum to join it. I traced the left vesiculae down to the testicle; but on following the right through the ring of the external oblique muscle, I discovered that it terminated at once, about an inch from its passage out of the abdomen, in a blunt point, which was impervious. On examining the spermatic cord from this point to the testicle, I could discover no vesicula deferens, but by beginning at the testicle, and tracing the epididymis from its origin about half way along, where it lies upon the body of the testicle, I found that it at first became fritillary, and soon after seemed to terminate in a point. The canal at this part was so large as to allow of being filled with quicksilver, which however did not pass far, to that a portion of the epididymis was wanting; and the vesiculae for nearly the whole length of the spermatic cord of the right side. On the left side the vesiculae began where the epididymis commonly terminates; and there was a deficiency of nearly an inch of the extremity of the epididymis. I then dissected the bag above-mentioned, which proved to be the two vesiculae; for by blowing air from one vesiculae I could only inflate half of it; and from the other vesiculae, the other half. They contained the mucus commonly found in these bags; but upon the most accurate examination I could discover no duct leading from them to the prostatic gland, nor any remains of one. In this subject it was evident that there was no communication between the vesiculae and epididymis; nor between these bags and the urethra. The caput gallinoginis had the common appearance, but there were no orifices to be seen. The testicles were very found; and the ducts from them to the epididymis were very manifest, and full of semen." P. 32-33.

Mr. Hunter observes further, in support of his opinion, that these bags are as full of mucus in bodies much emaciated, where the periton has died from a lingering disease, as in strong robust bodies, where death has happened from violence or acute diseases; and they are nearly as full in the old as in the young; which might probably not be the case if they contained semen." Ibid. p. 33.

The evacuation of the prostatic is the last ingredient in the seminal fluid; and it contributes very largely to the bulk of what
what is expelled in copulation. Its opaque whiteness and viscidity completely obscure the properties of the fluid secreted in the testis, and below on the female liquor its most obvious characters. The opinion which supposes that the semen is formed, or that part of it is produced in the prolate, is not therefore far from the truth. A thick, white, and opaque liquor may be expelled in considerable abundance from the prostatic ducts on each side of the caput galliaginis after death. Physiologists ascribe to the prostatic fluid the office of increasing the bulk of the semen, and of thereby augmenting its impetus; so that it may arrive with greater force at the place of its definition.

It has been conjectured that a copious fluid is mixed with the semen, and hence the weakness of the male after copulation has been explained. We may be excused from discussing this opinion until we know what nervous fluid is. The contralateral exertion of the whole frame, which occurs in the vesical organs, will sufficiently account for the sense of fatigue that follows it.

It appears from what we have said, that the fluid expelled in copulation is furnished in a small proportion only by the testes; that a peculiar secretion of the vesicular feminales is added to this, and that the chief bulk is made up of the prostatic liquor. An important question arises here, which of these is the essential and immediate agent in impregnation? The general practice in the East, continued from ages of the most remote antiquity, of entrusting their females to the care of eunuchs, and the common operation of gelding, as performed on various domestic animals, lead us to affix this prerogative to the fluid secreted in the testis. In emasculating animals, or men, the testes are cut or torn out, or they are compressed so as to destroy their organization, or the cord is so squeezed or bruised as to annihilate the functions of the part. Yet, under the circumstances just enumerated, we read of numerous examples where vesical definies have been experienced, where eversion, copulation, and emission have taken place, and even where children have been begotten. These examples, however, are too repugnant to the general effect of castration, as observable in man and animals, to allow us to admit them. Ordinarily we observe not only that no desires are felt, but also that the lofs of the organs, in which the natural and leading stimulus resides, occasions the other parts concerned in the business of generation to be much diminished in size, and altered in appearance.

Where emasculation has been performed merely by compressing the cord or testis, the organization of the part may not have been destroyed sufficiently to interrupt its functions, and such an animal might be still capable of fecundating; but no well authenticated instance can be produced of impregnation being effected where the testes had been cut out in any male animal. Yet it cannot be doubted that eunuchs may have eversions, since the seats of the physical feeling is in the glands, and the whole apparatus concerned in erection remains entire after the loss of the testes. A man, after the latter occurrence, like one who has lost his powers through age, may at times be stimulated by the recollection of past joys. Hence, in the East they value those eunuchs most highly, in whom the penis as well as the testes have been removed; no cause for the slightest jealousy can then remain. The prostatic liquor, or that of the vesicular feminales, might be discharged in the eunuch. If an animal has impregnated another after castration, there may have been some semen remaining in the vesicular feminales. Before the facts now enumerated, we may observe that all animals which copulate have testes; but that several have either no prolate or no vesicular.

The secreted semen is either expelled from the body, fully filling the purp. of its formation; or it is retained in its receptacles, and taken up by the absorbers. The seminal vesicles are always full of their peculiar fluids, which are only discharged at considerable intervals, and often only at periods of some months or years. As the testis and vesicular feminales posse numerous absorbers, we cannot doubt that the contained fluids are conveyed by these vesicles into the general circulation. It has been a general opinion that this absorption produces many of the changes which are well-known to take place at puberty; and which obviously depend, as we have already shown, on the testes. We refer to a former part of the article on this subject. The males of the great animals, when the rutting season approaches, have their whole bodies penetrated by a singular fetor, so that they are unct for food. The flesh at this time partakes more rapidly than at other seasons in the ill. That absorbed semen is the cause of this fetor, is rendered probable by the fact, that the removal of the testes destroys it; and by its absence from castrated animals of the same species. The same cause has been assigned for the phenomena consequent on conception in the female; but this seems very doubtful. This absorbed semen has been supposed by physiologists to act as a stimulus on the heart, and the organs of motion, to increase the muscular strength, and to contribute thereby to health of body and strength of mind. Hence, too, they have explained the softness and suppleness of the flesh observed in some animals after the copulating season; as, for instance, in the boar. The flesh of the fallox is remarkably changed in colour and flavour at this time. Castration produces debilitating effects both on the body and mind of man and animals; the ferocious and powerful bull is changed into the mild and patient ox. The influence of the same process in mankind has been already noticed; and we have sufficiently proved that the remarkable development of the frame at the time of puberty arises entirely from the influence of the testicles.

And it is no less true that the rest of the sexual organs are particularly affected by the presence and activity of the testes. In this country, we have little or no opportunities of observing in eunuchs the effects of the ablation on the other organs of generation; but we can see the consequences in animals. Following Hunter's opinion, the penis, urethra, and all parts connected with them, are in subterflect to the testicles, that he conceives, that most of them would have existed if there had been no testicles in the original construction of the body; these parts would then have been so formed as to assist merely in the expulsion of the urine. To illustrate this opinion, let us observe what is the difference between these parts in the perfect male, and in a male that has been deprived of the testicles when very young, at an age when they have had no such influence on the animal economy as to affect the growth of the other parts. In the perfect male the penis is large; the corpora cavernosa being capable of dilatation. The corpus spongiosum is very vascular; and that part of the canal which is called the bulb is considerably enlarged, forming a cavity; the muscular accelerators urinæ, as they are called, are strong and healthy. In many animals which have long penes, they are continued forwards to the end of it, and in others they are not extended so far, but are very large. On the contrary, in the castrated animal, the penis is small and not capable of much dilatation; the corpus spongiosum is less vascular; the cavity at the bulb is a little larger than the canal of the urethra; and the muscles are white, small, and have a ligamentous appearance. The same observations are true, if applied to the erectors penis. The penis of the perfect male is of sufficient length, when erected, to reach to the full depth of the vagina of the female. In the castrated animal it
is much shorter; and erections having thus become unnecessary, the parts which should project often adhere to the inside of the prepuce. The prostate, Cowper's glands, and the glands along the urethra, of which the Lacunare are the secretory ducts, in the perfect male, are large and pulpy, exerting a considerable quantity of a fliny mucous, which is felt to the taste, is most probably for the purpose of lubricating the urethra, and is only thrown out when the animal is in vigour for copulation; while in the castrated animal they are small, flabby, tough, and ligneous, and have little secretion." Animal Economy, p. 39.

It must be acknowledged that we have no very direct proof that any actual absorption of semen takes place from the tubercles or vesicles, and some physiologists deny it altogether. "I very much doubt," says Blumenbach, "whether red tiles however absorbed from its vesicular secretions in a healthy man—still more of what has been occasionally affirmed, that it is immediately conveyed into the neighbouring veins, and most of all, that such absorption (supposing existence to be granted) should be considered as a positive snail premature venereal infuini. On the contrary, if we compare the phenomena observed in animals, the injurious insensible nature of their desires at particular seasons of the year, with the constitution of such as are castrated, we shall rather deem such absorption the cause of that ungen receptive and almost furis appetite. I conceive that a very d sincere means (peculiar, as far as I know, to the human subject) has been adopted to answer the purpose just alluded to; viz. nocturnal emissions, which I refer to the natural excretions of man, inasmuch as their more rare or frequent occurrence, according to varieties of temperament and constitution, serves to liberate him from the troublesome and inconvenient consequences of an abundant seminal secretion. It may be readily granted that barbarous nations, of a phlegmatic temperament, and practising irregular sexual intercourse, do not require such an excretion: yet, I think it must be deemed a very natural and suitable relief in a young unmarried man, of a sanguine temperament, plectoric habit, lively and warm imagination, particularly if he indulges in a luxurious mode of life and enjoys perfect health. See Chr. Rud. Jaenicch de pollutione nocturna. Götting. 1795, 4to. Institut. Phylol. sect. 36.

The length of course, and the small diameter of the spermatic artery, together with the impossibility of forcing any injected fluid from its branches into the secretory tubes of the vesicles, have led physiologists to conclude that the secretion of the seminal fluid is performed very slowly. But various circumstances are capable of accelerating this process.

"Princeps est amor," says Haller, Elém. Physiol. 7. 551.

"Nemo forte fuerit, quin in juventute fua feminam concupisci esset; quin si cana fuit, in eum familiaritate ignes conceperit accidit; quin feminarum cum dolore et incommodo fii tertices tumesceret, et venas feminarum; dolore certe tanto, ut vis tangeres potest, tu regioni, viv incidere. Manifesso in huius modo accelerata ejus secrecione, ejusque liquoris major pars testis tenere dilinere. Id mali genus ex re extensa tranquillitate animi, et abstinentia amitum femineo fudato; et ecehriae eum feminam fructus capite paullo, et si neutrum remedium accedisset in difficiles tumores abire poterit. Quare in mature, ut plurimum ad movendam venereum irritamenta fainam et aliarum feminarum non imaginis affici labores, aut alia quæ rerum, qua per legem allocationis idiomarum venarum renovant: sua abstinentia eummodo illiuni, et cagitationes perpetuo ad alia averse. Ipsaque religio, in ea minuent feminis generationem, ut multo minori copia gigantor, neque molimentum, et demum vasa feminina pene coelest, atq gentilium mox ipa Cumaanatur. A healthy and strong state of the animal, nutritious and perhaps rather generous food, and a certain warmth of the weather, promote the seminal secretion. All these circumstances dispose the organs for action, when the natural feelings are duly excited; and the opposite causes, as inhuman fatigue, insufficient or bad food, and considerable cold, prevent the feelings or dispositions necessary for the action of the generative organs from taking place. The reproductive functions are much influenced by the season in animals, that it is only carried on at a particular time of the year; and the leading organs (the testicles) are reduced in many instances to a very small size in the winter. But in man, and in such domesticated animals as are not in a state of nature, no such change takes place in the testicles; they are consequently always in a good condition, and in that state to which other animals that are left to themselves, can only attain in the warmer seasons.

That the semen, secreted in the serpentine tube of the testis, is conveyed from them to the epididymis, and thence into the vas deferens, is sufficiently obvious from the anatomical structure. De Graaf proved it still further, by tying the vas deferens of a dog before copulation; all the secreting tubes were dilated to the utmost, and the testis considerably swelled.

We cannot doubt that the secretory vessels of the testis propel their contents by some contractile power; although the precise manner in which this is effected escapes our observation. Does the elevation of the testis to the ring, by the action of the cremaster, constantly observed to accompany emission, promote the progress of the secreted fluid? The immense length and numerous turns of the seminal tubes must render the passage of this fluid from its first secretion very slow; hence, when the supply contained in the vesicles is entirely exhausted, an interruption of some time is necessary for the reproduction of a sufficient supply; hence too, in the dog, where there are no vesicles, the act of copulation is uninterruptedly prolonged.

It has been generally considered that the fluid produced in the testis is deposited and retained in the vesicular seminifer, as in reptiles, until occasion occurs for its discharge. Mr. Hunter has endeavoured to show that those bags are not to be regarded in the light of receptacles for the semen, but as destined to perform a peculiar function. The common opinion rests on the facts of the very free communication between the vasa deferentia and venas, on the course which injected fluids take in the dead body, and the extreme malleability, numerous convolutions, and great length of the vesicular tubes, which seem very unfavourable to the production of semen in the sudden way, and at the very short notice at which it must be formed, if we do not suppose it to come from the vesicles. We have already detailed the proofs by which it appears that these organs perform a secretion; but none of those facts shew that the contents of the vesicles may not consist, in part, of matter formed in the testis. We know that the gall-bladder produces a copious secretion of its own; but that it also receives bile from the hepatic duct through the ductus cysticus. Mr. H. endeavours to adduce a decisive argument from comparative anatomy: he states that in many animals, the parts corresponding to the human vesicular seminifer have no communication with the vasa deferentia, and moreover, that their structure, in several instances, seems little calculated to make them receptive. Where the obvious structure is so different, we are by no means warranted in concluding that the functions are exactly similar. To argue that the semen does not pass into the vesicle of man, where the vasa deferentia are so intimately connected to those bags, because the analogous parts are not connected in other animals, is not more reasonable, than it would be to affirm
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affirm that the fluid of the vasa deferentia passes into the vesicles in animals, when the two are not connected, because the structure leads us to infer that it does so in man.

Mr. Hunter continues, "we may likewise infer, from what has been said, that the semen is not retained in reservoirs after it is secreted, and kept there till it is used; but that it is secreted at the time, in consequence of certain affections of the mind stimulating the vesicles to this action: for we find, that if licentious ideas are excited in the mind, and the paroxysm is afterwards prevented from coming on, the vesicles become painful and fæculated from the quantity of semen secreted, and the increased action of the vesicles; which pain and swelling are removed immediately upon the paroxysm being brought on and the semen evacuated; but if that does not take place, the action of the vesicles is still kept up, and the pain in the vesicles will generally continue till the paroxysm and the evacuation of the semen are brought on, which renders the act complete; without which a stop cannot be put to the action of the vesicles that produce the erection, nor the parts be allowed to fall back to their natural state. There is at this time no sensibility felt in the situation of the vesicular females. The pain in the vesicles, in consequence of their being filled with semen; and the action being incomplete, is sometimes so considerable as to make it necessary to produce an evacuation of the semen to relieve the patient." Animal Economy, p. 53.

We certainly admit with Mr. H., that the vesicular females of the human subject perform a particular secretion; but we do not conceive him to have succeeded in proving that they are not also reservoirs for the semen.

The opinion, which denies the vesicular females to be reservoirs for the semen, is defended also by J. A. Chaptal, in the Journal de Physique, February 9, 1787, p. 101. Soemmerring has refuted it in the third vol. of Blumenbach's Medicinische Bibliothek, p. 87.

The transmision of the sexes, from its dugs or vesicular, into the urethra, takes place under the influence of a particular state of mind; and its expulsion from the body is effected, in all animals which have a penis, by means of what is called the erection of that organ. In the human subject, this is an increase of volume produced by the dilatation of the three corpora cavernosa. Among the exciting causes of this process, we may enumerate, in the first place, the presence of a sufficient supply of seminal fluid; when this is present, any additional stimulus easily produces the effect. Hence, we observe, that the seminal powers of animals are the greatest, when their testes are of the largest size; hence, too, we may perhaps explain the erection sometimes observed after a full meal. A second and more powerful excitement is derived from mental causes. "Aliter ex cauda," says Haller, "in famo homine ut imaginatio, lice cupidus venereus, quae ex quacunque causa orta, lectione, vita pictura, memoria volapi tis prilim, co fabricatione, tactu, et aliis causis, in fama homine continue in erectionem erumpit. Edem nocturnum illam et solitariam veneream sola abolit, qui se natura nimiis feminis ured liberat varis, pro varia feminis abundantis, et femina acutior aut obtusiior, intervalibus. Nam prius facilissima, semen ex eae ex rario est, aut nulla. Soli homini data est, forte quod homo potilium memoria et imaginatione valere. Imaginazione solam, non erectionem, sed pleanum veneream, etiam in vigilius tibi pulvisque aquis animum. Neque potest abique imaginatio excitata usque haec opus perfici; ut inter, neque hactenus admata in feminas venas vix exerciti potissimum. Invenit ille impatientem ex veracrit, ex imaginaria debilitate, quia elenchum revoce, aut ex odio, quia quidem species cum relativa poteclata conjuncta est. Hinc manifesta irituationes ejus legis, quae ex congrupto de virilitate mariti judicabat, queen in exsilia uxor, post summam injuriam paflam, in conspectu tot hominum, feraces aperatur opus, ut utum impietatis veneoe juris perfectum. Quoae in Galilia anno, 1677, die 18. mensis Junii, rididus lex absolta fuerit, cum Marcius de Langey, a judicis poæ congradatrum pro impotente damnato, diffulto matrimonio, cerni aal uxor, morto filios generaret." (Element. Phys. Phil. 5, 577.) The peculiar odour exhaled from the female organs, particularly at certain feasons, is a very powerful incentive of venereal feelings in the animal kingdom. Haller considers that this causö acts in the human race also. "Propius partes genitalia ipsa adiecti, et excretionem extortae, angust et perfecto, frictio glandis, et potissimum colliculorum, qui sunt sub ortis uretrarum, quocumque fere modo et frictio administratur. Sed ea cum voluptate peculiari, summa, pene nimia, conjunctu, agitque iterum manifesto in nervos, ut vel ex acuto frui glandis conjuncte licet." Elem. Phys. Phil. ibid.

Erection of the penis takes place from various causes, not enumerated under the foregoing heads; and then it has no concern with the expulsion of the female fluid. When a person wakes in the morning, with the bladder tolerably full of urine, the organ is commonly erect; but it subsides when the water is evacuated. Striking the nerves with a rod is well known to produce erection; and has sometimes been resorted to, to rouse dormant passions. Calculus, Strangury, and hemorrhoids are sometimes attended with this symp- toom; which has been occasionally observed also in other affections. It is often particularly troublesome in gonorrhoea; and has been observed many times after death, particularly in those who have been baged. (See Morlagni's D. et C. Ep. xix.) Mechanical obstruction to the return of blood from the part will produce erection, and even such a toiling as ends in gangrene, if the obstacle be considerablenb and long continued. Ligatures, thoughtlessly placed on the penis by children, and the stricture produced by the retracted glands in paraphymosis, come under this description. In the same way dangerous swelling has been produced by drawing a ring over the penis. The effect of intercepting the return of blood is clearly shown, in an experiment made by Mr. Hunter on the dog. "In April 1760, in the presence of Mr. Blount, I laid bare the penis of a dog, about three quarters of its length, traced the two veins that came from the glans (which in this animal makes the large part of the penis), and separated them from the arteries by division, that I might be able to compress them at pleasure, without affecting the arteries. I then compressed the two veins, and found that the glans and large bulb became full and extended; but when I irritated the veins, in order to see if there was any power of contraction in them, which might occasionally stop the return of the blood, no such appearance could be observed." Animal Economy, p. 45, note 2.

That erection is produced by blood being sent into the penis faster than it can be returned, and that the encroached view of the organ is entirely produced by this confluence of circulation, are points clearly ascertained. The obstruction to its return is so complete, that no mechanical pressure applied to the body of the penis can force the blood on into the veins. The exact mode, in which this object is accomplished, has not, we believe, been as yet ascertained. There certainly is no power capable of directly compressing the veins; and the erect penis in particular, by drawing the organ away from the lymphatics pubis, would rather free them from pressure. The accelerator urinæ, by squeezing the blood forwards from the bulb, may make the front of the corpus spongiosum and glans rather more firm when they are erect, but can produce no effect on the penis in general. Neither
Neither is the phenomenon at all like those produced by muscular contraction: it is a quiet and gradual increase, and it often lasts for hours. Muscular action is sudden, and not of such long duration. There are other examples of analogous effects, which are totally inexplicable by muscular action. The nipple, when left to itself, like the penis, is soft and flaccid, short, and retracted; when excited by gesticulation, it rises into a cylindrical form, swells, grows red and warm; yet there is nothing like a muscle in the part. The red flabby organs about the head and neck of some gallinaceous birds undergo a similar process.

It appears, therefore, that the change termed erection, may take place in animal structures, without the assistance of any muscular power; and it is by no means certain, that any muscle is concerned in the particular case now under consideration. All that we can ascertain on the subject is, that the blood is sent into the corpora cavernosa in much greater quantities than it can return. If a mechanical obstacle does not produce that rigid state of the organ, which is created by the immediate action of desire, we conclude, that a more sudden and complete congestion is produced by the latter than by the former cause. We cannot explain how the proportion of blood, which arrives, is thus altered in relation to that which returns, any more than we understand the analogous phenomenon in inflammation. It does not seem possible to ascertain the mechanism of the process by actual observation. The circumstances already mentioned render it probable that the nerves are materially concerned.

Erection varies considerably in its degree. The organ at first swells, but continues soft; it then grows considerably longer, thicker, more firm and warm; and the glands become redder. The corpora cavernosa penis are first distended, and the glands secondly. In the state of greatest rigidity, it is proved, by ridiculous experiments, that considerable weights can be supported by the organ. The mere act of erection is not attended with those remarkable effects on the frame which accompany emission; it may be repeated or continued for any length of time without any injurious operation on the animal economy: hence, it is much more frequent than the latter act. Under the influence of certain feelings of the most acute kind, excited in the act of copulation, the seminal fluid is expelled from the ejaculatory ducts into the urethra. The pleasurable sensation is raised to its highest pitch, and is attended with a convulsive agitation of the whole frame, before this effect follows. "Maxima certe est in venere convulsi, et late patens tremor, ut feminic, cui chloris titillatur. Neque facta, neque posita, neque genua coarcere, ne tremant, et in accius res in pleno ejusdem erumpit: nihil autem minus factum in venere sensibile. Sinat, qui animo in venere lispantat, etiam feminic; fine non rari, qui in grato animo opere praeclaro, et antem omnino major multis veluptatis, etiam pl. pl. pl. animalium; nam mares, crasser pati exempla, feminae furentarian, et nonnamque penes virum e sub grat: et in viris gravis, febri venereus simpliciter folet, multis quant literis major, et ector est venereus atior. Et si aliquis feminae, et in obtus ocludere interior, quando femen co potest, manifeste tamen mus in egerendo feminic hierarchia, quae feminae in tene venere, furiae agitur. Quae anima seu corporis confitatis in facta tum, ut vinum robore aqua, anormales id hic esse redderet aequorum. Demum et comites vires vehementer instantatur, et pulsus acceleratur, sicut palpator, et refrenatio labitur, et calidum, quae nixom, parasomnia oriantur." Elemen. Physiol. 7. 515.

The anus is closed by its sphincter, and it is said that the levatores ani, by their mechanical Pressure, squeeze out the contents of the prostrate and vesicula into the urethra. Probably the coats of the vesiculae and vasa deferentia polish some contractile power, by which their evacuation is assisted. The contents of the prostrate and vesiculae are collected in the bulb of the urethra, which is elongated so as to form a kind of reservoir for them; and are expelled with some force, by successive spasmodic contractions of the accelerator urinae. As soon as this is finished, the temporary agitation subsides, the blood returns from the cells of the penis, and that organ regains its original magnitude. A degree of languor follows, proportioned to the previous excitation; the palpitation of the heart goes off, the hurried respiration is quieted, and the strength slowly returns. The frequent weakness is greater, in proportion as the act has been more frequently repeated, and at shorter intervals. In many animals, where the sexual appetities are only exerted at a particular season, and where the powers are exhibited and exercised on a much grander scale than in man, the debilitating influence is very strongly marked. The venereal powers of the human subject certainly appear very limited, when compared to those of most animals; with a due regard to health, he cannot much exceed the limits assigned by Haller. "Homines adeo medicum font vires, ut non plus multa quam bis in septem diebus coire posset, et si forte acer amorer percussus, potius longam alitatem, femina concepuita potius, aliquoties posset fermen emittere. Sed ex neque multum repeti poennis, neque durare." An attention to the dictates of nature will certainly enjoin temperance in these enjoyments. The performance of a function, so necessary to the continuance of the species, has been ensured by the physical pleasure associated with it; but the effects of too frequent repetition produce those serious consequences which the universal and violent influence of the act on our bodies would naturally lead us to expect. Severe nervous affections, impaired mental faculties, and premature death, are the sure concomitants of excessive venereal enjoyments. Whether the convulsive agitation of the body, or the emission, be the most injurious under these circumstances, cannot, perhaps, be decidedly ascertained. "Omnia illa majora et celeriora, et minus medicea manu obtentura, eventum ab illa dictationalis juvenum circiter, a qua essent, et in qua femina, multo quam in nature opere difficillius, excipitur. Ab ea enim corruptela impotentia infamabilis superficiei, et feminis fluxerunt voluntarum perpetuum, obliqua rigidius, tabes intra triumnum funicula, amnalis judicii vit, et omne fere malorum genus, quod votis velis avertetur." Elem. Physiol. 7. 539.

These circumstances render it very plain that polygamy is not suited to the organization and powers of man; and afford a much stronger argument against the practice, than the alleged superior numbers of females in Eastern countries would be in favour of it, even if the fact were well proved; which we by no means admit. We may call and ask, from the foregoing account, that the sexual functions ought not to be exercised, until the growth and strength are complete; and that all attempts at exciting the venereal appetites, before the natural period of their development, must be prejudicial. On this subject we should bear in mind the observation of Tacitus concerning the ancient Germans; "Seu juvenum Venus, seque inmediatam pueratas." Man is capable of exercising the generative functions through a certain portion only of his life. We have explained that the organ are in a state of very imperfect development during the early periods of his existence. Boys have erections, but they are not produced by those stimuli which act at a more advanced age. In the middle of Europe, a scarce-
a secretion of seminal fluid generally takes place about the
twelfth or fourteenth year, insomuch that it is commonly
discharged from the effect of dreams. Soon after this time
there is a complete capacity of performing the sexual func-
tions; and there is a well-known instance of a prince who
begot twins in his 16th year. The approach of puberty is
regulated considerably by the climate, and also by manners;
in warm countries it comes on earlier than we have men-
tioned, and later in colder regions. In the higher ranks of
society, where the feelings are prematurely and artificially
excited, and encouraged by a copious and generous diet,
and loose morality, the generative functions may be called
into exercise more early, than under the opposite circum-
stances. As the individual approaches to the 20th year, the
venerial susceptibility is considerably diminished. Semen
is still secreted, but hardly ever emitted during sleep, even after
the longest abstinence. The venerial act is more slowly
performed, but is equally effectual in producing impreg-
nation. From this time the powers are gradually diminished;
but a man of 60 may still become a father, although some
legislators have chosen to determine otherwise. A longer
continued and more powerful irritation is required to pro-
duce erection and emission at this age. In rare examples
men have been known to retain their powers of propagation
even to the age of 100 years; and it is very well authenti-
cated that Thomas Parre married at 120, and performed
the duties of a husband until the age of 142. These latter
examples may, however, be regarded as deviations from the
ordinary course; and we have equal remarkably instances
of the generative functions being performed at an unusually
early age. Perhaps the most remarkable case of this kind
is a boy now living in London, of whom an account is given
in the Medical-Chirurgical Transactions, vol. i. p. 276, &c.
At the time of birth this child had much long hair
on the head, and the futures of the cranium were perfectly
closed. At the end of the first year those changes took
place which usually happen at puberty. The penis and
testicles increased in size, hairs appeared on the pubes, and the
tone of the voice was evidently altered. From this time
his body grew very rapidly, and the expression of his fea-
tures, as well as the general organization, had a completely
manly character. The prominence of the thyroid cartilage,
and the voice, resembled those of a youth of 16. "The pubes
and femur are covered with black curling hair. The penis
and testicles are as large as I have seen in some adults. The
latter are firm and perfect in their formation, and the cord
could be distinctly felt. The usual brown appearance of the
integuments of these parts is here to be observed." There has
been a secretion of semen from the end of the second year.
This account was drawn up when he was three years old.
In his "Anecdotes de Medicine," Borden mentions three boys
who had strong venereal defiles between 10 and 11
years of age: the generative organs were unusually large
in these individuals, and were fully capable of exercising
their ordinary functions at this time. "It is no question
quoniam phylicum de l'amour; ils ne semblbient avoir
autre sensation que celle de cette passion; ils fe fondent,
pour ainsi dire, en feérens; ils traînaient leur caractère indivi-
duel de l'orgasme femelle." The most suitable and natural state
after the age of puberty, is that of marriage. If the design
of nature are not fulfilled;
if, by relating to satisfy the insatiable curve of love, we prevent
the excess of vital energy, which soon animates the generative
organs, from being carried off in its natural channel,
the accumulated irritability of these organs will frequently
disturb the whole frame by its re-action. The physical
feeling of love, the impulse of reproduction, has generally a
remarkable character of violence and energy in animals.
The phenomena of the rutting season shew the effects of
this powerfull appetite in a much stronger point of view than
they are seen in the human subject; as the influence of the
passion is here heightened by its being reduced within a short
period of time. Great fierceenes, impetuous motions, and
often even convulsions, are the effects of the new want in
many animals. Parrots, canary-birds, and bull-finchels,
experience attacks apparently of an epileptic kind, when sepa-
rated from their females. The physical appetite is rarely
accompanied with such phenomena in man. With many in-
dividuals, the obversion of the laws of chastity hardly re-
quires an effort. However, if the influence of the generative
organs should predominate so far as to constitute a well-
characterized erotic temperament; it was ardently imagined
and a forced state of celibacy should strengthen this tempe-
rament, its influence on the constitution may be excessive, and
cause various kinds of general disorder. Under the influence
of such circumstances, a folder feizd and attempted to viol-
a girl in public at Montpeller. Neither the publicity of
the occasion, nor the cries of his victim, nor the exclama-
tions and blows of the surrounding persons, could prevail with him
to relinquish his attempt, for which he was hanged. (Borden,
Anecdotes de Medecine.) The unnatural influence observed
from amokkemotions of religion, has produced very remark-
able effects in some cases. A Macedonian lather mentioned by Buffen,
in whom the feelings were very strong, longed to be permitted to
break his vow, cut away the organs. The same
author relates the sufferings of another individual during a kind of erotic delirium, which lasted for six months, and
seems to have amounted nearly to mental derangement.

**Female Organs of Generation**—Woman contributes more
largely than man to the business of reproduction; and the apar-
ratus destined to this function includes the generative organs,
properly so called, and the breasts. The female organs are
appropriated to the execution of a common object, to which
each contributes in its own way, and their development is
regulated by a common law. They are called into activity at
the same epocha, and their respective functions cease, or
at least their capacity of fulfilling them ceases at the same
time. The close sympathy which connects them has been
remarked at all times. The breasts, however, are
manifestly dependent on the generative organs; while the former
exercise but a very slight influence on the latter. As the
female organs are calculated by their formation to convey the
prolific fluid, so the female are constructed with a view to
its reception; and the two differ completely from each other.
Yet there is a considerable resemblance in some parts of the
apparatus in both sexes. Thus the clitoris, which is concealed
under the pubis in the inferior commissure of the labia,
reminds the penis in many points; differing from it
by having no connection with the urethra, and consequently
being imperforate, also in being very small in well-formed
individuals. The most convenient arrangement of the subject,
for anatomical description, is that in which the organs are
divided into the external and internal. The latter include the
diffusible agents of the generative process in the female;
the uterus, the vagina, and its appendages. The
former consist of a longitudinal slit, placed between the
thighs, containing the termination of the urethra and vagina,
and certain prominent parts composed chiefly of folds of the
integuments.

The external organs, which can be seen without the aid of
reflection, are the mons veneris, the vulva or pudendum, the
labia, frenulum, fossa navicularis, clitoris, hymen, meatus
urinarius, and opening of the vagina.

A broad prominence, placed in front of the pubes, and
between
between the groins, is called the mons veneris. At the time of puberty, this part becomes more convex, and is covered with hairs, of which the number, length, and colour, vary in different individuals. These very seldom advance along the middle line of the abdomen, towards the navel, as in man. Their eminence is formed simply by the accumulation of an adipose cellular substance at this particular point, and it consequently varies in size, according to the embonpoint of the individual. A longitudinal furrow, or slit-like cavity, extends from the mons veneris, between the thighs, to within an inch of the anus; this is called the vulva, or pudendum, (which names sometimes include, in a more large application, the external organs,) or fucus pudoris. This excavation is larger in women who have had children, than in virgin. The space left between the posterior end of the vulva and the anus, which may be about one inch in length, is the perineum, in which the sphincter can hardly be traced. The labia, or alae majores, are two elongated cutaneous eminences, filled with adipose substance, descending from the mons veneris towards the anus, and forming the lateral boundaries of the cavity just mentioned. They have been named, as a comparison with the lips of the mouth; but the furrow between them is vertical, instead of being transverse, as in the other instance. Their length, which is nearly the same in all individuals, and may be somewhere between two and three inches, determines the extent of the vulva. Their size and prominence vary according to the general embonpoint of the individual. These folds are thicker above than below; their external surface, which corresponds to the upper and inner side of the thighs, is covered with hairs similar to those of the mons veneris, and pusses some febaceous glands. The internal surface, formed by a mucous membrane, is smooth, soft to the touch, is contiguous to that of the opposite side, and to the nymphæ. In virgins the colour of this surface is red; it acquires afterwards a pale and rather livid cast. The upper edge of the labia is adherent, and continues externally with the integuments, on the inside with the covering of the nymphæ: the inferior margin is unconnected, convex, rounded, and covered with hairs, and exhibits the continuity of the integuments with the mucous membrane. The anterior, or superior extremity, is confounded with the mons veneris: the posterior, growing gradually smaller, ends in a point, and is united with that of the opposite side behind the fumicarctis. From this union a fine prominent ridge results, called the commissura of the labia majora, and in French la fourchette. The following parts enter into the composition of the labia; 10th, a continuation of the skin forming their external surface and inferior or convex edge, provided with febaceous glands, in the secretion of which the distinguishing colour of these parts resides; 12dly, a mucous membrane covering their internal surface, continuous on one side with the integuments, and on the other with the mucous covering belonging to the whole vulva; 3dly, an adipous tulle filling the interval between these layers, and giving to the parts their various degrees of thickness and prominence. The latter texture resembles on the whole that of the mons veneris, with which it is continuous, but it presents, in addition, some membranous lamina descending from the fumicarctis and pubes to the external edge of the labia. It does not contain so much fat as the mons veneris, and hence, like the scrotum of the male, it is a part in which unctuous depositions are frequently observed. The labia cover all the other external organs of generation, which, by this means, are coarsely moulded with a mucous fluid, preventing the effects of friction, and preserving the acute sensibility of the parts. In the ordinary attitudes of the body, these organs are in a state of mutual contact, and therefore completely conceal the parts which we are proceeding to describe: they are separate only when the thighs are thrown widely apart; they receive an extraordinary development during parturition, and thereby increase the capacity of the vulva. When the labia are separated, the following parts may be observed in succession from above downwards: 1. The clitoris, which appears as a small tuft, more or less prominent, separated from the upper commissure of the labia by a small smooth surface; 2. The nymphæ, also minores, or petties leaves, arising from the inferior lateral parts of the clitoris, descending and diverging as they descend, and lost on the sides of the opening of the vagina; 3. A triangular surface slightly concave, bounded above by the clitoris, below by the nuchæ, and at the extremity by the nymphæ, and sometimes called velum; 4. The meatus urinarius, situated about one inch below the clitoris; 5. The orifice of the vagina, with the hymen, or cutaneous myrtiforme, placed immediately under the meatus; 6. The fumicarctis, a small transverse depression, separating the entrance of the vagina from the frenulum; 7. The frenulum, or posterior commissure of the labia; behind which is the perineum. The clitoris occupies the upper part of the vulva, and forms a reddish slightly elevated tuber, which ordinarily does not exceed the level of the labia. Its figure is ebulliously conical, something like that of the end of the penis; this is called the glans clitoridis, and is covered by a loose fold of the mucous membrane lining the vulva, and named preputium clitoridis. Besides, the difference of its size, the want of a perforation at the extremity, sufficiently distinguishes it from the penis. A small part only of the organ appears on external examination; the larger portion, which is concealed, and can be brought into view only by dilatation, lies over the vagina, and under the arch of the pubes, and bears a great analogy to the penis, as it consists of two crura or corpora cavernosa, with erector muscles. These arise from the inner, and even posterior surface of the ramus of the ossa innominata; ascends, approaching to each other, and unite into a small cylindrical body, terminating in an obtuse extremity, called the glans. These crura are made up of a firm fibrous membrane, confused with the periostum, forming a tube filled with a cellular or spongy substance, into which blood is exuded from the arteries, to be again taken up by the veins, as in the penis. There is a complete septum between the two crura, so that they are distinct throughout. The spongy fibulacrum of the crura is more dense than in the penis, and consequently admits of less dilatation; hence the size of the organ is not greatly increased in the erectile state. The erector clitoridis muscle is analogous in every respect to the erector penis of the male; its origin, termination, and probably use, are similar, but the size is smaller in proportion to that of the crura. It arises from the inner surface of the lamina, ascends and passes forwards, and is implanted in a tendinous form, in the inferior and posterior extremity of the crura clitoridis. The substance of the glans is not different from that of the body of the clitoris, as there is no urethra in this organ, and consequently no peculiar corpus cavernosum. It is rounded above and slightly bifid below. The loose and folded prepuce covers it above and at the sides, but not below, being attached to the two sides of the slit, by which the part is marked in this situation. A white, friable, febaceous, and concreting substance, similar to that formed by the glandulae osifereae of the penis, is deposited under the preputium clitoridis. This secretion, being liable to accumulate, and becoming irritating in warm countries, is, as the case with the analogous substance...
The clitoris corresponds above to the arch of the pubes, to which it is fixed by a kind of supfenory ligament; below to the urethra, to which it is united by a loose cellular tissue.

It resembles the penis in its acute sensibility: "...ejus minre vehemens eff, ut tota cura ab ejus particulie solicitatione contremicam, femineaque tota extra sepolantur, nihilque possint prope negare. Quae extra venerem, in cauta femina parva fuerat, led etiam modo arriget et intumecit, ut prepslere veneri inferirae posset, multoque nuf ejus turpidudinis dignus moles ejus augetur, ut omnim membra felet, quibus multum utinam. Quae caua videtur fully, cur orientales populi, accurati capilatibus mulcibus cutodes, hanc insuper natus puellis amputaverint, an certe ferro decurtaverint."—Element. Physiol. lib. 28. § 20. We have made some observations, concerning the occasional increase in size of this part, in the remarks on Hermaphroditism.

The nymphæ are two membraneous folds, united above to the prepuitum clitoridis, and depending about as far as to the middle of the aperture of the vagina. They are thin and flattened, broad in the middle, and narrower at the two extremities. Their external surface corresponds to the inside of the labia, while the internal, approximating above to that of the opposite side, corresponds below to the meatus urinarius and orifice of the vagina. Their adherent edge is tolerably thick; while the loose margin is thin and convex: the latter is sometimes wrinkled or notched, so as to have occasioned a comparison of the part to a cock's comb. The superior extremity arises from the prepuitum or glans clitoridis: the inferior ends at the side of the vagina. They are smooth and of a red colour in young women, and acquire a darker hue in older subjects, and particularly such as have had children. They are formed of duplicatures of the membrane lining the vulva, filled internally with a cellular substance, free from fat: and they contain sebaceous glands, the excretory ducts of which form very obvious pores: they differ very much in size. Ordinarily, they are completely covered by the labia, when approximated. Sometimes they form scarcely perceptible prominences, while at others they are very large, and hang down between the labia, so as to form an inconvenient obstruction to the sexual functions; in this case their surface is irregular, being grooved and tuberculated. Such formations are more frequent in the inhabitants of warm climates, where it is not unnatural to cut off some part of them; and the operation is even occasionally practised in European countries. Frequently one is larger than the other. They polledls considerable sensibility. The chief ufe assigned to them is that of affitting, by their development, the enlargement of the vulva during parturition: the dilatation of the parts by the passage of the child destroying the fold. The name of nymphæ was given to them from a supposition that they regulate the jet of urine; but as women evacuate this fluid with the thighs apart, and as the direction of the flow seems to depend on entirely on that of the urethra, we cannot adopt this supposition. And we are further confirmed in rejecting the opinion by the existence of these folds in many animals where they can have nothing to do with the stream of urine.

We have nothing further to say concerning the vestibulum, except that the surface is smooth, and that it is terminated below by the opening of the urethra, which is about three quarters of an inch, or an inch from the clitoris. The description of this canal, and its termination, will be found, together with that of the female bladder, under the article Kidney.

Immediately under the orifice of the urethra is the entrance of the vagina, called sometimes the os externum uteri; the diameter and appearance of which vary very considerably in different individuals. In virgins this opening is very narrow; it is broader after the sexual act has been performed, and most ample in women who have had many children. The narrowness in the first cafe arises from the presence of a duplicature of the mucous membrane, called the hymen, which contracts the opening so considerably, that marriage cannot be consummated without its being ruptured; hence, after this laceration, the entrance of the canal is more free. As the parts are vascular and sensible, more or less bleeding and pain generally attend this dilatation of the aperture; and these circumstances are expected in some countries as the necessary proofs of virginity in the bride. However, they do not always attend the first coition; and it should be noted, by the following quotation, that the existence of the hymen hangs by a very slender thread: "...L'hymen, pendant le premier âge, est très mince, il rompt facilement et il détruit, lorsque on efcape au trau de management les parties extérieures de la génération, soit lorsque l'enfant nait même, avec ou sans intention, contracte des habitudes Léthargiques, prepare et dépose ainsi aux pluies folatrices, des organes qui font à peine chouchouts."—Moreau Hift. de la Famme. tom. t. p. 53.

The hymen is a duplicature of the same membrane which lines the entrance of the vagina, and has the same texture and properties. It is soft, red, vascular, and sensible. The polserior surface is reticulated, as the columns of the vagina terminate on it. Its size and figure vary very considerably. Generally it has the shape of a crescent, with the concavity turned upwards or downwards. The convex edge is attached, the concave hole: the former is fixed to the inferior part and sides of the vagina: the latter is turned towards the urethra. The orifice of the vagina, in the virgin, is the space bounded in front or above by the meatus urinarius, below or behind, and at the sides, by the loose concave edge of the hymen. The dimensions of this opening must depend therefore on the breadth of the hymen, which differs much in different individuals: ordinarily, it will admit the little finger without any stretching. This crescented or faliform figure of the hymen is seen only when the labia are drawn apart, and the sides of the vagina gently stretched; for in the ordinary attitudes, the membrane is thrown into longitudinal folds, the sides of the vagina coming into contact with each other, so that the entrance of the canal is completely shut. However, the space left between the urethra and the edge of the membrane will always allow the escape of the menstrual discharges. The lower part of the hymen is the broadest, and the horns of the crescent, where they advance along the sides of the aperture, grow gradually narrower, until they are completely lost.

Sometimes the hymen is continued under the orifice of the urethra, so as to form a complete membranous circle, perforated in the middle, instead of a crescent. Indeed Haller, and many other very accurate anatomists, have found the fold, when the parts were carefully examined in water, generally continued under the urethra; but very narrow at that part. In more rare cases the hymen is an imperforate circular membrane, attached to the edge of the orifice of the vagina in every part, so as to close the canal completely. Such females have been termed atroce, by a word derived from the Greek, and signifying imperforate. As there is...
no aperture in such cases for the discharge of the menstrual fluid, it accumulates in the uterus and vagina, and must be evacuated by a surgical operation, consisting of a puncture of the hymen. For the various appearances which this part exhibits in different individuals, the reader may consult J. G. T. Tolberg, de varietate hymenum, Hal. 1791, 4to.

It has generally been ascertained, that the hymen does not exist in quadrupeds; but the statement of Cuvier, in his "Les Animaux comparés," vol. 3, ldp. 29, sect. 6, art. 2, clearly establishes this fact very doubtfully. The general opinion of its non-existence in the other invertebrata appears, and the circumstances of its being found in women only, at a particular period of life, and even then not universally, have led many anatomists to deny its existence in the human species. But the fact is so clearly proved by the concurrent testimonies of all modern anatomists, who have enjoyed favourable opportunities of dissection, that we need not find Bisson's opinion concerning the point; any of his anatomical friends might surely have convinced him by oculor proof. Though we are fully convinced, by repeated observation, that Buffon's opinion is incorrect in point of fact, we cannot help admiring the eloquence with which he inveighs against the different opinions and practices which have prevailed on this subject. "Les hommes," says he, "abolit des principes en tout genre, ont toujours fait grand cas de tout ce qu'ils ont cru pouvoir poiffer exclusivement et les premiers: c'est cette efièce de jolies, qui a fait un être réel de la virginité des filles. La virginité, qui est un être moral, une vertu que nous confîte que dans la puretě du cœur, est devenue un objet physique dont tous les hommes se font occuper; ils ont établi fur cela des opinions, des usages, des fémoves, des superstitions, et même des jugemens et des peines; les abus les plus illicites, les coutumes les plus déformées ont été autorisées; on a loufnis à l'examen de matrones igno- rantes, et expose aux yeux de médecins prévenus, les parties les plus sacrées de la nature, sans fonger qu'une parcelle indécence est un attentat contre la virginité: que c'est la violer que de chercher à la reconnoître: que toute situation honteuse, tout état indécenl, dont une fille est obligée de raconter intérimement, est une vraie déclaration. Je ne peur pas réciter les prejuges ridicules qu'on a formés sur ce sujet; les choses, qui font plaisir à croire, seront toujours crues, quelque vaines et quelque déraisonables qu'elles puissent être: cependant, comme dans une histoire on rapporte non seulement la suite des événements, et les cir- constances des faits, mais aussi l'origine des opinions et des erreurs dominantes, j'ai cru que dans l'histoire de l'homme je ne pourrois me dispenser de parler de l'idole favorite à laquelle il sacrifie, d'examiner quelles peuvent être les raisons de son culte, et de rechercher si la virginité est un être réel, ou si ce n'est qu'une divinité fabuleuse."

"It is not so easy to explain the use or purposes of this membrane, as to establish the fact of its existence. The partisans of final causes have been much puzzled in attempting to display the wisdom or goodness of the Creator, as evinced in this part of our anatomy, and have as yet assigned no rational explanation of it. We subjoin from Haller, a statement of the commonly received notions, which, however, appear to ourselves entirely unsatisfactory."


"Et elemos."

"Elem. Physiol. lib. 28, fept. 2, § 27."

After the hymen has torn, the entrance of the vagina presents some bulky prominent tubercles, called carunculae myrtiformes, and varying in number and form. These are generally considered to be the remains of the lacerated mem-brane; "et corrupte adeo pudicitia indicia." The carunculae are generally largest at the sides of the vagina, where the hymen is narrowed; so that all these prominences cannot well be referred to the origin just mentioned. Some are found behind the hymen, and exist previously to the laceration of that membrane: these are the prominent, obtuse, and callous apices of the columns of the vagina. Lastly, there are projections at the termination of the mucous ducts, which may be enumerated among those carunculae: and warts are sometimes formed in this situation. Whatever their origin may be, we find from two to five or six rounded and firm, or thin and loose prominences, of a red or livid colour, about the entrance of the vagina.

The frenulum, or fourchette, is a cutaneous field of a crescent shape, with the concavity upwards, placed behind and below the entrance of the vagina, visible in the virgin flat, when the sides of the vulva are drawn apart, but not well marked when the parts are collapsed. It lies between the two labia, not quite at the lower extremities, and is extended almost to the symphysis, protecting in some degree the entrance of the vagina. It is near to the hymen, which it resembles in some respects. The act of copulation does not injure it, but repeated parturitions entirely efface it. A very manifest transverse cavity, named the fossa navicularis, is intercepted between the frenulum, the hymen, and the Labia; and this cavity is lost of course when the frenulum disappears, so that it may not be recognizable in married women.

A mucous membrane, by which the genital and urinary organs are united in the female, is continued over all the parts contained in the vulva, and even forms many of them. It arises on the loose convex edges of the labia, and on their commissures; covers the internal surface of their folds, the space below their anterior commissure, and the fossa navicularis, then forms the nymphæ and preputium clitoridis, covers the vestibulum, is continuous with the lining of the urethra, and with that of the vagina, after forming the hymen or caruncula myrtiformes. It is connected to the subjacent parts by a copious and loose cellular texture, in which, generally speaking, there is very little fat. Its colour is of a tolerably bright red in young women; but it assumes darker shades in more advanced ages, particularly when the sexual functions have been much exercised. The texture of the integuments changes gradually into this mucous surface, so that there is no abrupt line of division, and an epididymus can be distinctly demonstrated at its origin. The colour proves that it is copiously fopplicated with blood. The membrane is soft on its surface, and plentifully bedewed with a mucous fluid, poured out from small tubes, which commence by open orifices, and run into the substance of the membrane, where they terminate by cul-de-sacs. These, which are called lacunæ, are similar to what we have described.
The internal Organs of Generation.—The vagina, or cul-de-sac
uteri, is a membranous canal, extending with a very slight oblique
to the pubis, between the urethra and bladder, which are in front of
the vulva, to the neck of the uterus. Its anterior portion
was, during parturition its is nearly tranverse; the posterior portion
the anterior is shorter than the posterior. We shall describe in it an
external and an internal surface, and two extremities.
The external surface may be divided into an anterior,
a posterior, and two lateral regions. The anterior, forming
upwards and slightly concave, corresponds to the bladder
and urethra, being connected to the former by a loose
and firm substance. The posterior region, forming from
above and behind downwards and forwards, is gently
convex, and corresponds to the rectum; its superior half,
being covered by the peritoneum, is simply contiguous to the intes-
tine; while the inferior part, polishing no such covering, is
connected to the intestine by cellular substance. This con-
necting medium is much looser above than below; and in
the latter situation it is difficult to separate the two organs
without cutting one or the other. The lateral regions are
narrower than the parts just described, and surrounded by
much cellular substance. They correspond to the ureters,
the blood-vessels of the uterus and vagina, and below to the levatores ani. The internal surface of
the organ presents a vast number of folds and prominences,
which make it irregular throughout. These cellous
rugosities exhibit a most elegant arrangement in the infant,
and in the virgin; they are conflated and partially obliterated
by parturition, but are very soon restored, and may often
be very distinctly observed even in old women. In some
subjects, however, the whole vagina is nearly smooth.
The half of the canal next to the uterus contains the fewest and
least remarkable irregularities; the folds here are soft, molly
transverse, but sometimes partly oblique. These promin-
ences are jagged laminae, ending in a thin edge, turned
towards the opening of the vagina, differing in size and
variably interwoven with each other. On the anterior half
of the canal are raised two prominent columns; an anterior
and a posterior one. These are becfit with hard and nearly
cartilaginous wart-like prominences, closely arranged, of a
roundish figure, and circumcised by grooves. The ante-
rior column is the largest, and corresponds to the orifice of the urethra. Frequently this is bised towards the front, and
its two portions, joined by transverse ridge, end in the hy-
men. The front end of this column sometimes projects like
a papilla at the orifice of the vagina. The posterior or
larger column is exactly opposed to the anterior, and corresponds
to the rectum; sometimes it is hardly distinguishable. This
ends also in the hymen, and in some instances projects an-
teriorly like the anterior column, but less considerably.
From each of these columns, hard, cartilaginous, transverse
or oblique folds are extended; they project downwards,

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have a jagged edge, and are mixed with variceae and other
lefs prominent liiniae in various directions. Between the
two columns is a reticulated surface, formed by the trans-
verse productions. The use of this structure does not seem
very obvious. It may possibly facilitate the dilatation of the
organ. "Voluptatem et arterium augere credites, nil in
uteri servici fimiles valvata rect credas. Arclant tamen emi-
nendo vaginam; et inferior columna partis glandis femino
vicine occurrit. Sedulium vaginam etiam facere credas,
quod ob has valvulas et pilis majis confractur. Insetam
hanc tamen subito," Haller, Elucid. Physiol. lib. 28.
All the generative apparatus abounds with mucous, and
this moisture is obviously convenient in many of the functions
of the part. In the female it appears as a whitish milky
kind of fluid; and it is a true mucus in the adult. The
floor absas and genitourae seem to be merely a differed ilate
of this secretion. Round livid spots are frequently observed
on the smooth part of the vagina, near the uterus; their
cause and nature are unknown. Numerous pores are ob-
served among the folds and rugae of the vagina. Enflata-
chius noticed osfucces in the membrane; i. e., tolerably large
flats, sometimes ramified, and containing mucac. No glands
can be discovered in the organ.

The superior extremity of the vagina is united to the in-
ferior part of the neck of the uterus. It embraces the lat-
ter organ obliquely, so that the anterior surface of the vagi-
na is nearer to the os uteri, and the posterior is more re-
move from it; and the vacancy between the vagina and the
neck of the uterus extends higher behind than before. The
inferior extremity occupies the lower and posterior portion
of the vulva, in front of the anus, and ends there by the
orifice which we have already described. The sides of the
vagina, poifces coniderable thickens and strength. The
upper half of its posterior surface is covered by peritoneum.
The chief subjacent of the canal is a thick, close, and firm
texture of a greyish colour, poififing large vessels, and
having fibres in various directions, so as to give it somewhat
of a muscular appearance. It appears to be continuous
above with the subjacent of the uterus. Below it is sur-
rounded by a kind of corpus cavernosum, of about an inch
in breadth, and two lines in thickness, composed apparently
of veins, and called the plexus reitiformis. A determination
takes place to this part at the time of copulation, and it
experiences a kind of swelling analogous to erection. On the
whole, the membrane of the vagina is not so thick, as the
dilatation which it experiences in parturition might lead us
to expect. Excepting where it is covered by the perito-
neum, and by the plexus reitiformis, the surface is surrounded
by a copious cellular subjacent, containing many vascular
ramifications.

The vital properties of the sides of the vagina are not well
understood. Some ascribe to it a contractile power, excrec-
as, as it is said, in cotton, and felt by the hand when introduced
in the prococies of midwifery. The phenomena of partur-
ition shew that it poifices in a high degree the powers of ex-
tension and subsequent contraction.

The internal surface of the canal is lined by a mucous
membrane, to which the peculiar hifue of the vagina already
mentioned adheres very closely. It is continuous with the
membrane of the vulva; and, after lining the vagina, is ex-
tended over that portion of the cervix uteri, which projects
into the canal, and communicates, at the os tunicae, with the
lining of the uterus. This mucous lining forms all the ine-
qualities already described; it is thicker near the vulva, and
grows manifestly thinner towards the uterus. At the en-
trance of the canal it has a red colour, which changes
farther into a grey or whitish cafe, diversified near the cervix
uteri by the livid spots already mentioned, which give it a
marbled appearance. The almoft carthaceous hardnefs of
the membrane in some parts is peculiar to the vagina, as well
as the permanent folds in its structure; in other mucous mem-
branes the inequalities are occasioned by some external caine,
and disappear by extenfion. Some anatomists affcribe an
epidrhmos to the vagina; but this point is doubtful. The
organs, by which its mucous fluid is secreted, have been already
mentioned.

The place of the accelerator urine of the male subject is
occupied in the female by the sphincter vaginae, which covers
the plexus reitiformis. It descends on each side from the
body of the clitoris, behind the erecter; surrounds the an-
erior extremity of the vagina, immediately behind the
labium, where it poifies considerabfe breadth, and terminates
below, on each side, in the lateral fibres of the sphincter ani.
It must have the power of contracting the front orifice of the
vagina.

The arteries of the vagina come from the internal iliac;
its veins join the venous plexus, which surrounds the canal.
The lymphatics are not well known; the nerves come from the
facial trunks.

The uterus is the organ in which the facts and its coverings
are contained until the time of parturition. It is almost
always single; in some rare cases there have been two uteri.
There is some variety in these inances; either there may be
two uteri and two vaginae; or a single vagina divided by a
feptum in its whole length, or in its upper half; or one of
the uteri may open into the rectum, and the other into
the vagina. In some cases the uterus is divided internally
by a longitudinal septum, either confined to the neck, or
prolonged to the orifice of the vagina. Sometimes the uterus
is altogether deficient. A vast number of references to au-
thors who have related examples of all the above-mentioned
unusual formations may be seen in Voiglet's Pathologifche
Anatomic, b. iii. p. 452-456.

This organ is situated in the pelvis, behind the urinary
bladder, before the rectum, below the convolutions of the
ilium, and above the vagina. Its situation is oblique, the
fundus being placed upwards and rather backwards, the
neck downwards, and slightly inclined forwards. Two
broad folds of peritoneum, named the ligaments lateral uteri,
fix it to the side of the pelvis. Other ligaments assist in
maintaining this viscus in its situation; viz. the round, the
anterior, and the posterior ligaments.

The broad ligaments extend from the sides of the uterus
to the sides of the containing cavity. Together with the
uterus they form a complete transverse partition, dividing
the pelvis into an anterior and a posterior cavity, of which
the former and smallest contains the urinary bladder, the
latter and largest, the rectum. These ligaments are flat-
tened from before backwards and quadrilateral. Their two
surfaces are smooth, and unattached; the anterior being
turned directly forwards, towards the bladder, the posterior
directly backwards, towards the rectum. The upper edge is
divided into two prominent lines; of which the anterior and
highest contains the Fallopian tube, the posterior, the ovary
and its ligament. The three other margins are adherent to
the inferior, to the lower part of the pelvis; the external,
to the side of the cavity; and the internal to the lateral margin
of the uterus. These ligaments are formed by two layers of
peritoneum, between which are placed the vessels and nerves
of the uterus, the ovaria and their ligaments, the Fallopian
tubes, and some cellular subjacent. They fix the uterus in
its situation, and give it a covering, in proportion as it in-
creases in size during pregnancy; they consequently become
much narrower at the time; in the latter months, indeed,
they,
they are almost entirely effaced, so that the tubes and ovaries, which they contained before the enlargement of the uterus, are now applied to the contiguity of the lateral and inferior parts of the uterus, in consequence of the manner in which this organ has separated the two layers of peritoneum.

The anterior ligaments are two small folds formed by the peritoneum, as it is reflected from the back of the bladder to the front of the uterus. They are visible only when the two viscera are separated from each other, and they appear under the form of creases, with the concavities directed upwards. The posterior ligaments are two other folds of the same membrane, where it is continued from the back of the uterus to the rectum. They resemble the former in every respect. The round ligaments are two whitish cords, extended from the upper angles of the uterus, in front and rather below the Fallopian tubes, to the groins. They pass first outwards and rather upwards, in the broad ligaments, on the front surface of which they form a remarkable prominence, they then pass on the inner surface of the iliac vessels, behind the peritoneum, to the upper opening of the abdominal ring. They traverse that canal in a direction obliquely downwards and inwards, just as the spermatic cord does in the male subject, and escape at the lower orifice. They then separate into several threads, which are lost in the cellular substance of the mons veneris and labia. These ligaments are slightly flattened in their whole extent, and broader at their two extremities, than in the middle. They are arched, so as to describe altogether a semicircle.

The round ligaments are composed of longitudinal fibres, confiding apparently only of a dense cellular tissue, very slightly susceptible of extension, of blood-vessels and lymphatics, and nerves. As they are swelled in pregnancy, and in some affections of the uterus, this circumstance has been employed to explain the pains in the groins experienced by females on such occasions. They contribute to fix the uterus in its position, and to limit its motions.

The ligaments, which we have just particularized, are so disposed, as to allow to the uterus, in its natural state, a certain degree of mobility. Hence its situation may be slightly changed in all the considerable motions of the abdominal viscera in general; coming to the ground on the feet with much force, a violent exertion in raising a considerable weight, a deep, forcible, and long continued inspiration, all tend to force the uterus downwards into the vagina, and thereby to produce the affection termed prolapso or defect of the uterus. Distention of the bladder, or of the rectum, occasions changes in the position of the uterus. But age and pregnancy produce the most signal effects in the position of this organ.

In an adult and unimpregnated female, its length is about 2½ inches, its thickness one inch, its breadth at the fundus ½ or 2 inches, and at the cervix about ½ lines. Although it returns after parturition to its original size, it never becomes again so small as it was in the virgin. Its figure on the whole is triangular, with the base upwards, and the apex downwards, and flattened from before backwards. It is divided into two parts, a superior and a broader, named the body; an inferior and narrower, called the neck. The body of the uterus is nearly oval externally, with the greatest diameter transverse. We observe in it an anterior and a posterior surface, a superior, an inferior, and two lateral sides. The anterior surface, slightly convex, slopes gently downwards and forwards, and corresponds to the bladder. The posterior, more convex, is inclined in the same direction, and is contiguous to the rectum. The superior edge, which is named the fundus, and which extends from one Fallopian tube to the other, is gently convex, and supports the convolutions of the small intestine. At the ends of this upper edge angles are formed between the fundus and the lateral sides of the viscera. To these angles of the uterus the round ligaments, the Fallopian tubes, and the ligaments of the ovaries are attached. The inferior edge, much shorter than the superior, is continuous with the neck of the organ; and indeed the line of separation is imaginary. The lateral sides are very short, slightly convex, and converging; they give attachment to the broad ligaments, and are concealed by them.

The neck of the uterus resembles a cylinder, slightly flattened from before backwards, and continued downwards from the body. Its long axis is perpendicular to the transverse diameter of the body. We describe in it an anterior and posterior surface, two lateral margins, and a superior and inferior extremity. The two surfaces are convex and smooth; the former corresponds to the bladder, and the latter to the rectum. To the sides, which are straight, the broad ligaments are attached. The superior extremity is continuous with the body of the organ; the inferior is obliquely embraced by the vagina, in which it projects, more considerably on the interior than on the posterior part. This extremity is perforated by an oval opening, with its long diameter placed transversely, named the os uteri, os internum, or os tenuis. The latter name has been given to it from a comparison to the mouth of the tenses; the end of the uterus is obtuse, and as the aperture is transverse, there is some resemblance to two thick lips. In a newly born child, the length of the opening is two lines; in a girl of twenty years, three lines; in women, who have had children, five to eight lines. The orifice is always naturally gaping, but it is more or less fo, in proportion as women have had many children, or none. Instead of being exactly in the middle it is rather behind; so that the anterior lip of the orifice is the thickest. That portion of the cervix uteri, which projects into the vagina, and forms the os tenuis, is about four or five lines long in front, and rather more behind; it measures about eight or nine lines transversely, and fix or eight from before backwards, being slightly flattened in that direction. This part of the uterus is sometimes much longer and thicker, without any displacement of the organ, or swelling of its neck. In women who have had many children, the neck of the uterus is generally thicker, and more rounded. Its orifice is almost always very gaping, and the lips more or less irregular, presenting generally one or more grooves or chaps, separated by a kind of tube recte. The os uteri may however be as regular in its figure in women who have had children, as in others; and, on the contrary, it may present in the latter those irregularities which are more usual in the former. Hence the differences drawn from the state of this part, in infancies where infanticide is suspected, or where parturition is supposed to have been concealed, are very liable to uncertainty.

The cavity of the uterus is proportionate to the bulk of the organ when it is empty; the parietes are contiguous, and leave between them no farther vacuity than suffices to hold a little mucous fluid. In this hollow the menstrual discharge flows, and the produce of conception is received. It is divided into two parts, one belonging to the body, the other to the neck of the organ. Of these, the former is the largest; its figure is nearly triangular, especially when the uterus has experienced no alteration in its bulk. We have to notice in it an anterior and a posterior surface, three edges and three angles. The two surfaces are smooth and contiguous to each other. On each of them a slightly prominent longitudinal line may be observed, dividing
disting them into equal right and left parts. Of the three margins one is superior, and two lateral: they are slightly concave, particularly in women, who have had many children. The superior, which makes the basis of the triangle, and is continued from one Fallopian tube to the other, is usually the thirtd: sometimes, however, it is the longest. Of the three angles, two are superior, and one inferior. The former may be considered as two slender appendages of the cavity, terminating at the Fallopian tubes. The inferior angle presents an opening of about four lines in extent, communicating with the cavity of the cervix. The cavity of the body of the uterus is lined by a mucous membrane, on which the vessels that furnish the menstrual blood terminate.

The cavity of the cervix uteri is a kind of canal, flattened from before backwards, and more capacious at the middle than at the two extremities; so that it has the figure of a cone, joined by its base. Such is the figure which it constantly exhibits in women who have never borne children; but, from the time of conception, that tractility of the canal, which opens into the vagina, is dilated; and after parturition has once taken place, it is always found much wider than before. It then represents a cone, with the base towards the vagina, and the apex towards the uterus. The cavity of the cervix uteri has an anterior and posterior surface, and a superior and inferior orifice. A great number of hard, and as it were cavernous, differently disposed in different subjects, may be observed on each of the surfaces. In order to see their arrangement to advantage, the uterus of a newly-born child, or of one not very old, should be selected. They will then be observed in an arborecent form (arbor Morgagni) on each surface. A hard ridge extends along the middle of each surface, and ends above in a flattened point, which is often continued with the line dividing the corresponding surface of the body of the uterus. The inferior end is prolonged to the os tinnce. From this kind of trunk laminae are extended laterally on each side; the superior ones forming nearly half right angles, and the inferior more open angles. The number of these plates may amount to about 15. They are continued outwards, describing a curve, of which the convexity is always towards the uterus, and the concavity towards the vagina. Their margin is grooved, except towards the outer end, which is smooth. The breadth of the laminae diminishes insensibly, and they disappear on the sides of the cavity, where the anterior and posterior ones are confluent with each other. The superior are broader than the inferior. These laminae are not simple, they produce other smaller ones. More or less deep grooves separate the plates from each other: in the bottom of these are observed small eminences, like the teeth of a comb, passing from one lamina to another.

The disposition of these wrinkles is regularly such as we have described in newly-born infants; but, when the cervix uteri is enlarged in pregnancy, the eminences are flattened, and the whole structure is confluent; this is still more remarkably the case just after parturition; the laminae are then nearly destroyed, and the arborecent appearance almost entirely effaced.

The superior opening of the cavity communicates with that of the bay, so that they form indeed but one. The inferior has been already described under the name of os tinnce.

In the cervix uteri we may notice the openings of numerous lacuna or short ducts ending in cul-de-sacs, concealed among the rugosities already described. Most of these are small; some are larger and long. There are fix or seven just above the os tinnce, the fundus of which is towards the inferior end of the uterus. These are large, and receive the terminations of several smaller ones. They are filled with a mucous fluid, which can be squeezed out, and they will often admit of a fine bristle for a certain length. They are best seen in a woman who has just been delivered, or who has died in the latter periods of utero-gestation; the prominences being flattened, the lacunae are more exposed. These organs secrete the mucous fluid, with which the cervix uteri is moistened.

We see also sometimes in this cavity a considerable number of round or oblong, larger or smaller follicles, formed of a thin membrane, filled with a clear mucous fluid, and not polluting any excreta duct. They adhere to the trunk or branches of the arborecent structure already described, and their number is not constant. Sometimes they are half buried in the substance of the uterus, sometimes they are completely isolated, and hold only by a pedicle. Their nature and use are not known. Probably they are one source of the mucous secretions of the part, although we cannot explain how the secreted fluid is evacuated.

The thickness of the sides of the uterus varies from four or six lines to fifteen ; but it is not uniform in all parts of the organ. It is much the same on the surfaces and edges. The fundus is generally the thickest; and this is thicker in the middle than towards the angles. The neck is rather thinner than the body. The substance of the organ is of a greyish colour, and a firm consistence, especially towards the neck, which is more compact than the rest of the organ. It consists of an external membrane, of a proper tissue, of an internal membrane, of arteries, veins, lymphatics, and nerves.

The external membraneous covering is contributed by the peritoneum, which is reflected from the posterior surface of the bladder over the uterus, of which it covers the anterior surface, the fundus, and the posterior surface, is continued to the upper half of the posterior surface of the vagina, and is reflected from that vertex to the rectum. It adheres every where to the proper tissie of the uterus by means of a very fine and close cellular texture, without any fat. It is very difficultly separable, particularly at the fundus.

The proper tissie forms nearly the whole thickness of the organ. It is a greyish, dense, and very compact substance, very refising to the scalpel or scissors, cutting almost like cartilage, and containing numerous small vessels. This substance, which appears cellular, spongy, and to contain fluids, is manifestly fibrous; but the order and arrangement of the component fibres cannot absolutely be determined in the unimpregnated state, on account of their being so inextricably interwoven. They are larger and more confidcd in the cervix than in other situations, where they are softer and more numerous. Although in the empty state of the organ these fibres have scared any of the characters of materiality, their nature seems to be sufficiently pointed out by the contractile powers which they exhibit in parturition.

The external membrane of the uterus is continuous on one side with the mucous lining of the vagina, and gives origin on the other to two prolongations, which enter into the Fallopian tubes. It is extremely thin, and so closely united to the proper tissie of the organ, that it seems to form one substance with it. It reddish in the body of the uterus, and whiter in the neck. It is perforated by an infinite number of pores, which are merely the extremities of exhaling vessels, and give issue to the menstrual discharge.

Appendages of the Uterus.—Under this name are included the
the round ligaments which have been already described, the ovaries, and the Fallopian tubes.

The Fallopian or uterine tubes are two (a right and left) conical, tortuous, and vermiform canals, arising from the inferior and lateral parts of the uterus. They float loosely in the cavity of the pelvis, being enveloped in the upper and anterior edge of the broad ligament, and fixed by their inner extremities. Their length is four or five inches; and the direction of their course very uncertain: it may be stated in general that they go transversely outwards, and that they bend backwards at their outer ends, so as to turn towards the ovaries. But, as they are in great measure loose, and as the edge of the broad ligament restrains them but slightly, the intestines, when diffused with air or aliments, may displac them in different directions. The calibre of the tube is so narrow towards the uterus, that the orifice by which it communicates with this viscus will only admit a hog's brittle. It enlarges gradually to the middle, where it is slightly contracted; and dilates again to terminate by an aperture which communicates with the cavity of the abdomen. The tube is considerably broader at its end than at the uterus, but rather narrower than in the portion immediately preceding. The internal membrane of the tube, together with the external, which is formed of peritoneum, is produced to some length beyond this orifice, and forms round it a fringed and radiated kind of ornament, called the fimbriae (pavilion de la trompe; morceau frangé). When this part is examined in water, it has a very beautiful appearance, and seems composed of small separate leaves, like hone flowers. The breadth of this membranous fringe is not equal at all parts; its circumference has somewhat of an oval figure. All the portions into which it is divided are not of the same length: the longest extends to the ovary, and is firmly fixed to its outer extremity, so that the fringed end of the tube is constantly retained near to that body. The fimbriae are conceived to poffefs a muscular structur.

The Fallopian tube is composed: 1st. Of an external membrane, furnished by the peritoneum, which covers it as it does the intestines; 2. Of an internal, soft and pulpy membrane, the surface of which presents everywhere where more or less prominent longitudinal lines, covered by some authors to be muscular fibres. Indeed the office of the tube seems to require the existence of contractile fibres in their composition; 3. Of a spongy tissue, compared to that of the urethra and corpus cavernosum, but the real nature of which is not understood. Very numerous blood-velsels are distributed in this substance, which appears to swell and experience a kind of elevation in the act of copulation: in consequence of this the fimbria are applied to the surface of the ovary; 4. Of blood-velsels, derived from the spermatic arteries and veins, of lymphatics, and nerves furnished by the renalplexuses. That the office of the tube is immediately connected with the functions of generation, and that they convey the germ from the ovary to the uterus, cannot be doubted: but we do not understand how they execute this function. We may observe that they form a communication between the uterine cavity and that of the abdomen: and, as the former communicates externally through the medium of the vagina, the serous membrane of the abdomen has thus a continuity with the surface of the body:—a circumstance that is observed in no other instance.

The ovaries, called by the ancients the female testicles, are two oblong, flattened, and whitish bodies, placed at the posterior surface of the broad ligaments, in which they are included. They nearly equal the size of small pigeons' eggs in the adult; but their flattened form gives them a different figure. Their long diameter is placed transversely. They present two surfaces, two edges, and two extremities. The surfaces and the upper edge are loose, and present nothing remarkable except slight tubercular ridings. The inferior margin adheres to the posterior edge of the broad ligament. The external extremity is connected to the longitudinal Fallopian fimbriae; and the ligament of the ovary is attached to the internal end. This ligament is a small fibrous cord, about ½ inch long, contained in the posterior part of the broad ligaments, and fixed to the angle of the uterus behind the Fallopian tube. Some old anatomists regarded it as a canal destined to convey into the uterus the leucos, which they supposed to be secreted by the ovaries; but it is in reality a solid fasciculus, similar in its nature to the round ligament, and having no other office than that of fixing the ovaria in its place. Yet the latter organ possesses considerable mobility; its situation in the broad ligament, which is itself moveable, gives it a power of motion. The intestines and the urinary bladder may make it change its position; and we know that it has sometimes been contained in a rupture.

The ovaries are composed: 1st. Of an external membrane, derived from the peritoneum forming the broad ligament; 2. Of a proper membrane, of a white colour, and firm fibrous texture, hardly separable from the proper tissuse of the organ; 3. Of a spongy substance, which is dense on the outside, more soft on the inside, where it is greyish, and in some degree cellular and spongy. In this substance are lodged some small, roundish vessels, amounting in number to between fifteen and twenty. Scarcely visible in infancy; these are very apparent in adult and fruitful women. Generally, in old women, these vessels are no longer visible, and their place is occupied by hardish tubercles. The vessels are not all of the same size; those which are near the surface of the organ are as large as hemp-seeds; while the others, being more deeply seated, are considerably finer. These bodies are placed in the cellular or spongy substance of the ovary, in which they may be said to be enchaufed; but they form for the most part small prominences under the external membrane. Others are completely elevated on the surface of the organ, and others again are concealed in the interior. They are not suspended by filaments, nor do they form any particular cells different from the cellular matter comprising the parenchyma of the ovary. They were very particularly described by De Graaf, and have often been called, after him, ova, or ovula Graafiana. They are generally regarded as so many germs, or rudiments of new beings. They are composed of a simple and very thin membrane, smooth externally, and containing a clear, sometimes yellow or reddish liquor, coagulable by heat and alcohol, and forming white threads, like the alubums of an egg.

The arteries of these parts are derived from two sources: viz. the spermatic branches of the aorta, and the uterine branches of the internal ilium. The former are more tortuous than the corresponding vessels in the male; they pass between the two layers of peritoneum, which form the broad ligaments, and are chiefly distributed to the ovaries. But they send numerous ramifications to the Fallopian tubes; others to the sides of the uterus, and form along the round ligaments, which communicate with small branches of the epigastric. The chief arteries of the uterus are the uterine branches of the internal ilium trunk. They partly fill the uterine arteries, ascending in the left and right. These arteries first runs downwards, then turns up at the neck of the uterus, and enters between the layers of the broad ligament. It gives large branches to the vagina, then runs along the side of the uterus, from the neck towards the fundus, producing numerous arteries, which ramify over the organ in every direction. These have a tortuous course, and communicate freely with each other, and with those of the opposite side.
Some ascend to the upper edge of the broad ligament, are distributed in the Fallopian tube and round ligament, and communicate with the peritoneum.

The veins, like the arteries, may be referred to two divisions: the peritoneal and uterine. Numerous branches come from the uterus, ovary, and Fallopian tube, and form a large venous plexus in the upper part of the broad ligament; under the name of corpus pampiniforme, this ascends towards the loins, and terminates in forming a single vein, which has the same termination in the male subject. A great number of venous ramifications accompany the arteries all over the viscera, but are in general less tortuous. They communicate freely with the peritoneum. They form a large plexus running along the side of the uterus, with the uterine artery, and end in one or more considerable venous trunks, which join the internal iliac.

The uterus possesses numerous lymphatic vell, which are divided into three orders: one of these ascends with the round ligaments, and goes to the inguinal glands; another joins those of the vagina, and passes to the pelvic glands; and the third, together with those of the ovary and tube, ascends with the peritoneal vell, to terminate at the glands in front of the aorta and vena cava near the kidneys.

The nerves come from the great sympathetic, of the hypogastric and peritoneal plexuses, and from the pelvic plexus.

Fetal Properties of the Uterus.—Until the period of impregnation, this organ seems to poffef only that modification of sensibility and contractility, which are necessary for the purposes of nutrition, and the menstrual evacuation. It seems doubtful whether or not it is endowed with animal sensibility in its healthy state. It has been imagined, and attempted, that the contact of the glans penis with the os tincæ, in copulation, is one source of the physical sensation experienced by the female on that occasion: this we conceive to be problematical. Hailer states, that a wound of this organ by a leaden bullet produced very violent symptoms; viz. repeated faintings, and speedy death. It must be doubtful how far this could be referred to the uterus merely, as much other injury must have been inflicted in such a case. Animal sensibility is certainly developed in the uterus by disease, whether it exit in the natural state or no. The same observations may be applied to the vital properties of the Fallopian tubes and the ovaries. However obscuring the vitality of these organs may be exhibited, when not immediately engaged in the exercise of their important functions, it is manifested in a much more striking point of view by the sympathies established between them and other parts of the body. We have already shown, that the removal of the ovaries at an early age entirely changes the subfquent characters of the animal; affecting even the organization of the bony and muscular parts of the frame. From the time of puberty, when the organs now under consideration acquire a fitness for exercising their particular functions, we shall find that their condition and various changes affect in the most striking manner all the other vital phenomena of the female constitution. The previous symptoms, the commencement and periodical returns of menstruation; the first impulses of love; the change to a new temperture; pregnancy and its various epochs; perturbation and its consequences; lastly, the cessation of the sexual life, and the symptoms of the critical age, are so many remarkable changes in the organization of the female, keeping up a constant alternation of suffering and disease, of lively impressions, nervous and spasmodic affections, the influence and general result of which must be carefully attended to in apprehting the nature of woman, and the part which she has to fill in society. When we con-
marked, is nearly white, and does not exhibit those successive shades which, at a more advanced age, distinguisn its erine, its middle, and its posterior extremity. In the newly born child, and during the first years of life, the uterus does not occupy the cavity of the pelvis; together with the ovaria and tubes, it is placed above the superior aperture. At this time it is very small, and has a very different figure from what it presents when perfectly developed. The neck is larger and thicker than the body, which narrows, and elongated, has not the triangular figure. The parietes of both are thin, and the cavity very small. The tubes are proportionate in length to their future flate.

From birth till puberty, the generative organs of women experience fewer changes than those of men: yet they grow in proportion as the body encreases; and to those, which at first were remarkable for their size, as the clitoris and mons veneris, gradually lose this distinction. The uterus appears less elevated above the pubes, in proportion as the pelvis changes its form and proportions, and as the superior aperture becomes less inclined. It encreases principally in breadth and thickness, but its growth is not very rapid. The changes which occur at the time of puberty, considered in an anatomical point of view, are not considerable; there is a remarkable revolution in the vital powers of the generative system, rather than any considerable increase of the organs. The internal parts, however, at this time, have acquired their complete size, and the external organs become covered, in the situations already particularized, with hairs.

In extreme old age, the generative organs of the female, already reduced for a considerable time to complete inaction, bear the marks of decrepitude common to the whole frame. The vulva presents the most remarkable changes; this is the part most affected by the performance of the sexual functions, and many parts of it partake the general encreasement. The prominence of the mons veneris is nearly effaced, and a great part of the hair, which covered it, is lost; the remainder becoming grey and straight. The labia and mons veneris are soft and flaccid; the latter sometimes can scarcely be laid to exst: the mucous membrane is whitish, or at least very pale in its colour. The blade of the vagina presents nothing very remarkable. The volume of the uterus is diminished, its parietes having become thinner. The tubes and round ligaments are also in some degree reduced. The ovaries do not exceed half the size which they had in the adult age; they are sometimes very denfe, and marked with deep grooves, so as to render the surface tuberculous; in other instances, their subsidence is removed, so that they are reduced to a very thin appearance. The vessels contained in their parenchyma are no longer discernible.

State of the Generative Organs during Pregnancy.—The uterus, intended to serve as a receptacle for the fetus, dilates after it has received the germ from the ovary, and enlarges in proportion as this is developed: its blood-vessels bring an additional quantity of fluid, from which the fetus draws its support: lastly, at a certain period, fixed by the laws of nature, it discharges the produce of conception by virtue of the vital properties, with which it has been endowed, during the remarkable change of its organization. Such are the threefold objects, to the attainment of which are directed the new dispositions acquired by this organ during gestation.

The anatomy of the gravid uterus has been most fully elucidated by Dr. William Hunter, whose splendid and beautiful plates form an engraving in the history of our knowledge of this subject. "The Anatomical Description of the human gravid Uterus and its Contents," London, 1794, drawn up by Dr. Ballie, from the papers of Dr. Hunter, contains Vol. XVI.

a very clear account of the subject; this, with the plates already mentioned, is the source from which the following description is principally derived. The observations, unless where it is otherwise expressed, apply to the state of the organ as it is found in the 9th month.

Considerable variety exists in the size of the organ. The child and placenta may be twice as large in one case as in another: there may be six or eight times more water in one case than in another; not to mention the differences arising from there being only one child or twins, &c.

The development of the uterus appears to be immediately produced by the general dilatation of the liquid surrounding the fetus, and not by the fetus itself, since the latter does not come in contact with the organ. The size of the part depends principally upon the quantity of the liquor amni. For, though woman who have twins, or a very large child, are commonly observed to be very big, yet the greatest number of those who are really very much swelled out, are so only from a vast quantity of water. In such cases there is frequently but one child, and that very often a small one.

The general figure of the uterus is oviform; the fundus answering to the largest extremity of the egg, and its inferior and uterine to the small end; but the fundus is larger and more flat, or less pointed, in proportion to the lower extremity of the uterus, than one end of an egg is to the other; and the whole uterus seems more or less compressed, so as to be broader from right to left, than it is from the forepart backwards. Besides these more constant deviations, the figure of the uterus differs from the regular oviform, from a variety of accidental causes, as it adapts itself to the neighbouring parts, to the attitude of the body, and to the position of the contained child. In order to conceive these varieties more easily, we must remember that in most cases the uterus is not so completely filled as to be upon the full stretch. Were it out of the body, and filled artificially, it would easily contain more than it actually does. Thus the uterus, like a bladder of water not quite full, is pliable, and moulds itself into various shapes from accidental circumstances.

The figure of the organ, in particular situations, is modified by the pressure of the surrounding parts: the brim of the bony pelvis has the effect of a belt girding the lower part of the organ, and the projections of the spine, and of the psoe muscles, and bone vessels, mould the outside of the uterus into corresponding cavities. The attitude of the body influences the figure of the uterus, as the parts against which it rests vary in different postures. The position of the child is another cause influencing the figure of the uterus. Not only in dead bodies do we see the parts of the child making various different projections on the outside of the uterus; but we can frequently observe the same variety in the living state, by examining the outside of the abdomen. The round projecting ball, made by the child's head or buttocks, is commonly very perceptible, and in many instances smaller parts, as the knees or elbows, can be distinctly felt. Dr. MacKenzie met with a case of twins, where the uterus, instead of making one compacted oval body, had stretched into two distinct bags, containing the respective fetuses; so that its outside was marked by a notch, dividing it into two apartments, as deep and distinct in proportion, as that in the heart represented on cards. The organ often stretches unequally in the corresponding opposite parts; so that either the right or the left half may be considerably larger than the other. It may swell unequally on the front or back part, so that the diameter between the insertions of the Fallopian tubes may be much smaller either before or behind them, in the opposite directions. In the unipregnated state, it has commonly one triangular cavity: but it is sometimes subdivided, at its upper part.
part, into two lateral cavities, so as to bear some analogy to the two horns of the uterus in a quadruped. This peculiar conformation may explain the unequal extension of the two sides in some cases of pregnancy; and may elucidate the above-mentioned cafe of Dr. Mackenzie.

The small or lower end of the organ is placed in the cavity of the pelvis. This generally contains the greater part of the child's head, and fills up the cavity so completely, as to press the bladder against the pubes, and the rectum against the facrum. Tho os uteri is directed against the coccyx, or the lower part of the facrum. The body and fundus, which contain the rest of the child and the placenta, are so placed in the front of the abdomen, from the brim of the pelvis upwards, to the epigastric region, as to be under and before all the other bowels, and in immediate contact with the parites abdominis, and to occupy the whole space from one hip-bone to the other, and a proportional extent from these bones upwards. As it rises up from the cavity of the pelvis into the hypogastric and unilobal regions of the abdomen, the loose connections of the intestines andomentum can take account for these parts being pushed up before it.

The axis of the uterus is oblique, its lower end being turned backwards, and the upper p. proportionally forwards. This obliquity is changed by the attitude of the body, and by many other causes. In the erect posture, the weight of the uterus presses the first part of the organ into a greater rotundity, and its axis then approaches the nearest to a transverse or horizontal line. In the recumbent posture, the contrary situation is exhibited. In a first pregnancy, the uterus stretches itself higher up in the epigastric region, and its axis comes nearer to the longitudinal or vertical direction, because the parites of the abdomen do not easily give way: but in a woman who has had many children, the abdomen, by repeated dilatation, is rendered more loose and pendulous, and the uterus extends forwards rather than upwards. This position is more remarkable in very short subjects; because in them the chest is so near the pelvis, that the uterus is flopped in affect. The same circumstance happens, and for a similar reason, when the pelvis is very narrow: as no part of the organ, in such a case, can be lodged in the pelvis, it must be placed proportionally higher. In a very short and crooked woman, on whom the csarcan sectio was performed, the fundus uteri was not only turned forwards, but even a little downwards. As the lay upon the table, the navel could not be seen, as it was placed on the posterior and inferior part of the abdominal tumour. In order to expose that part of the abdomen to the surgeon, it was necessary to lift up the fundus uteri, without which the hypogastric region would have been inaccessible. The deviation of the organ towards the right or left side cannot, in general, be very considerable; as it poises nearly the whole space between the hip-bone, and its lower extremity is fixed to the pelvis. A small lateral obliquity is very common; and we can easily suppose, that in a reclined posture, the projecting of the lumbus vertebra will throw rather more than one-half of the uterus into the lateral cavity between the spine and one hip-bone. We know, indeed, that in all the last months, the abdomen is often more full on one side than on the other. Women lay in such a cafe, that the child lies on one side, and they judge rightly. Where the child lies the bulk must be both more considerable and more permanent, but where there is only uterus, placenta, and water, the swelling will be softer, and project less. The pressure of the child, when it lies more in one side than in the other, makes the limb of that side weaker, more benumbed, and more liable to cramps, and oedematous swellings.

Of the Ligaments, Tubes, and Ovaria of the Pregnant Uterus.—It has been commonly observed that the ligaments and tubes of the pregnant uterus are attached lower upon the side of the organ than they were in the unimpregnated state; and the reason is very obvious. The peritoneal coat of the uterus makes the broad ligament on each side, much in the same manner as the analogous membrane of the intestines makes the mesentery. When the woman is not pregnant, the ligament is of considerable breadth, the spermatic vessels pass between its two lamina, the round ligament runs downwards and outwards, on its anterior surface, and the tube runs in loose peritoneum turns on its upper edge. But in proportion as the circumference of the uterus grows larger, the broad ligaments become narrower, their posterior lamella covering the posterior surface, and their anterior lamella the anterior surface of the uterus itself. We observe now, that the round ligaments do not run down on the foremost part of the broad ligaments, but upon the foremost part of the body of the uterus itself. In proportion as the fundus rises upwards, and increases in size, the upper part of the broad ligament is fo stretched, that it clings close to the side of the uterus, so that in reality the broad ligament disappears, no more of it remaining than its very root; namely, its upper and outer corner, where the group of spermatic vessels passes over the iliacs, to the side of the uterus. In this state, although the small end of the tube opens into the same part of the uterus, as before impregnation, yet the tube has a very different direction: instead of running horizontally outwards, it passes downwards, closely attached to the side of the uterus. Behind the fimbrice lies the ovarium, also connected to the uterus. The fimbrice and ovarium are commonly placed upon the fickle vessels, or fleshy brim of the pelvis, behind the group of spermatic vessels.

The round ligaments run almost perpendicularly downwards from the fundus uteri to their passage through the muscles; they are considerably enlarged in thickness, and are so vascular, that when injected they seem to be little more than a bundle of arterics and veins. Their arteries are all convoluted. Both their arteries and veins proceed principally from the spermatics, and anastomose evidently with the external vessels in the groin or upper part of the labia. Even in this enlarged state of the round ligaments, it is very difficult to say how they terminate in the groin: they appear to be infeinbly lost. The tubes are more fleshy, vascular, and soft in their subsurface, and are less convoluted than in the unimpregnated state. The fimbrice and internal rugae are larger and much more beautiful, especially when their vessels are well injected. The ovaries, excepting that which contains the corpus luteum, seem to have undergone no remarkable change. The latter body can be distinguished by a rounded fullness, and frequently a considerable prominence, sensible both to the sight and touch, upon the middle of which there is a small pointed cavity or indention, like a cecixir. Upon lfitting the ovarium at this part, the corpus luteum appears a round body, of a very distinct nature from the rest of the ovarium. Sometimes it is oblong or oval, but more generally round. Its centre is white, with some degree of transparence; the rest of its substance has a yellowish cast, is very vascular, tender and friable, like glandular flesh. The larger vessels appear round its circumference, and send smaller branches inwards. A few of the larger vessels are situated at the cecixir or indention on the outer surface of the ovarium; and are there so little covered, as to give that part the appearance of being bloody, when
when seen at a little distance. When there is only one child, there is only one corpus luteum, and two in case of twins. There may be, in the latter case, two distinct ones in one ovary, or one in each ovary. The sex of the foetus has no relation to the corpus luteum, being formed in the right or left ovary.

**Thickness of the Uterus.**—Those who say that the uterus grows thicker in proportion as its bulk is increased, have probably been deceived by examining the uterus of a woman who died some hours or days after delivery. In that contracted state the uterus is often found even two inches thick: but in the natural dilated state, though there may be some difference, the thicknefs, in general, is but little more considerable than before impregnation. When not injected, its ordinary thickness is from one to two-thirds of an inch; when its vesfdels, and particularly the veins, are pretty well filled with wax, its thicknefs is thereby considerably increafed, more especially where the placenta is fixed, on account of the number and size of the vesfdels at that part. For this reason only, perhaps, the uterus is thickest at that part, and for the fame reason it is thicker towards the fundus than near the cervix. Much variety may be observed with respect to thicknefs: and such inequalities in the fame individual, that even where the placenta did not adhere, the uterus may be almost twice as thick at one part as at another. On opening the organ, its thicknefs is generally found more considerable than external examination would have led us to expect. For its substance is soft, and a fluctuation, like that of water in a thin bladder, may be felt.

**Blood-vesfdels.**—There is no circumstance, in which the gravid uterus differs more from the unimpregnated, than in the size and termination of its vesfdels. The arteries, both spermary and hypogastric, are very much enlarged. There are infinite numbers of anaimolous arteries through the whole thicknefs of the part, fo that the whole uterum makes a general net-work, and the branches are convoluted or serpentine in their course. None of the larger ramifi- cations are seen for any length of way upon the outsife of the uterus. As they branch from the fides, they disappear by plunging deeper and deeper into the thicknefs. The arterial branches, which are much enlarged, are thofe which run towards the placenta; fo that, wherever it adheres, that part appears evidently to receive by far the greatefl quantity of blood; and the greatefl number, both of the large and fmall arteries at that part, pafs through to the placenta, and are necessarily torn through upon its separation. The branches of the uterus appear to be fill more enlarged, in proportion, than the arteries. From the fides of the uterus they ramify through its thicknefs, running deeper and deeper as they go on, and without following precisely the course of the arterial branches. They form a plexus of the largest and moft frequent communications which we know of among the vesfdels of the human body. And this they have in common with the arteries, that their larger branches go to, or rather come from that part of the uterus to which the placenta adheres; fo that, when the venous fystem of the uterus is well injected, that part is evidently the chief source of the returning blood. Here, too, both the large and fmall veins are continued from the placenta to the uterus, and are always necessarily broken upon the separation of these two parts. The veins are without valves, and are therefore easily injected. In injecting them, we observe that at first they become turgid, and project on the outer surface of the uterus; but in proportion as we throw a greater quantity of wax into those vesfdels, they grow more flat and obscure; because the uterus itself becomes more filled and tenfe, which has the effect of com-

The vesfdels are more numerous, and many of them larger than could have been imagined. They pervade the thicknefs of the organ uniformly. Its peritoneal coat appears, like that of a calf's fileen, to be interwoven with a crowded plexus of these vesfdels; and where they get to the fides of the uterus, when filled with mercury, some of them are even larger than a goose's quill. Some are remarkably variegated, or enlarged at particular places.

We do not know that any change takes place in the nerves of the uterus during pregnancy.

**Muscular Fibres of the Uterus.**—The substance of the organ is rendered remarkably soft and loose in its texture by pregnancy; fo that, when an incifion is made into it, the wound can be easily made to open wide; or if a narrow ilrip be cut out, it can readily be extended to at leaft twice its original breadth. This laxity appears to depend on two caufes; viz. the great quantity of large vesfdels in its composition; and the loose fibre connection between the falficuli of its fibres. When we speak of the muscular fibres, it is dif-

cult to treat the subject with precision. We neither know their external appearance, nor their internal composition. They only manifest themselves to our fenses, where numbers of them are collected into bundles, and make what we commonly call muscular falficuli. In the quadruped, as, for instance, the cat or rabbit, the muscular action of the uterus is seen as evidently as that of the intestines, when the animal is opened immedi-
ately after death. In many parts, particularly of the internal surface of the uterus, thefie fibres have the fame striking falficulated appearances as we observe in common muscles; yet they are of a paler colour and harder texture. Dr. Hunter exa-
mined the fibres very carefully in a woman who died seven days after delivery. He stretched it gradually in warm water, and then inverted it, to have a full view of the inner surface. The remains of the decidua had paifed off with the lochis, fo that the falficulated ftratum of muscular fibres appeared to be bare, and to make the internal surface of the uterus. In many places, but particularly where the placenta had been fixed, the falficuli left oval fpaces between them, for the paffage of arteries and veins, somewhat like those separa-
tions between the tenuous fibres of the abdomen and thighs, where veins pafs out to the cellular membrane and integuments. The cervix uteri, where the rufle are intimated, had not such regular nor fo large falficuli as the rest of the uterus. In the body of the organ the fibres were very regularly circular. The falfidus was made up of two planes of concentric fibres, at the very centre of which was the orifice of the Fallopian tube. When this internal ftratum was removed, the falfi-
culated appearance and regular direction of the fibres was lefs and lefs apparent, in proportion as the deflufion was continued outward; which seemed to be owing in great meafure to the infiniite number of branches and communications of the large veins. Afterwards, says the doctor, I had the most favourable occasion that could be defired, for examining the fibres on the intine of the uterus. It was in a woman who died at the end of the ninth month, without being in labour, and without having any loothing or discharge of waters. When I had examined, and taken out all the contents, I attended particularly to the internal surface of the uterus. I found it every where covered with a thin ftratum of the decidua through which the muscular fibres appeared, but with some degree of obscurity. Upon rubbing off this tender membrane with a cloth, it gave mee

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pleasure
pleasure to see how exactly the above description agreed with the appearances.

The existence of muscular fibres in this organ has not, however, been universally acknowledged. "Reflexing the alleged muscular texture of the uterus," says Blumenbach, "I must observe that all the human uterus, which I have carefully examined both in the pregnant and unpregnant condition (and I have had opportunities of such investigations, not merely in preparations, but in the most recent flate after death) have not exhibited any thing that could be taken for genuine muscular fibres. The advocates for the muscularity of this organ must allow that the fibres differ moit remarkably from all others in the body. I am more and more convinced every day that the uterus possesses no true irritability; but that it poiffes, if any part of the body can be said to posses, a peculiar modification of vitality (vita propria) corresponding to its peculiar motions and functions, and not referrible to the common laws of irritability. These functions appeared vs irregular and peculiar to the old physicians and philosophers, that they called the uterus an animal contained in an animal." Institut. Physiolog. p. 222.

The mouth of the uterus differs considerably in the different times of utero-gestation. For the greatest part of the nine months, that is, till the cervix uteri be fully dilated, there is a projection of bone of the anterior and posterior part of the os uteri; and in some women this continues till the very time of labour. But in most women, when they are at their full time, or very near it, the os uteri is flat, and makes only a small ragous hole, often not readily discoverable by the touch on the lower or posterior part of the rounded lower end of the uterus. The border of the orifice, and the internal surface of the uterus, for an inch or more all around, is full of little irregular cavities. These contain a tough mucus, which shoots across, and plugs up the inner part of the orifice. This mucus is commonly squeezed out from all the lacunae, by the dilatation of the os uteri in the beginning and progress of the labour; and so loosing its hold, it falls out. In the dead body, when the part is kept some days in water, the glutton swells out more and more from all these cavities, and then separates entirely. Then the innumerable lacunae, which contained it, being empty, are very visible. And if the glutton be thus carefully taken away, and be floated in water, its external surface is seen beautifully ornamented with all the processes which were drawn out of the innumerable lacunae.

I have given the above account of the uterus in the earlier months of pregnancy. "In the third and fourth months, the substance of the uterus become more soft than before conception, and all its vessels being proportionally enlarged, it appears to be much more vascular. We may, therefore, reasonably believe, even if we knew nothing from diffections of quadsels, that the uterus changes its nature in that respect from the time of conception, and receives a greater quantity of blood. Its thickens is only a little increased in its natural state, but considerably when the veins and arteries are artificially dilated with any fluid. At this time the conception is lodged entirely in the fundus uteri, or in that part which in the unimpregnated state has a smooth internal surface; no portion of the conception touching that part, and being crowded between the two layers of the uterus, which is narrow and rugged within.

The cervix uteri remains contracted and hard in its substance, and contains a tough and firm jelly, which cement and fills up its cavity so completely, that, upon attempting to push a probe through it, the probe will as readily force its way through the hard substance of the uterus itself, as through the cementing jelly. When the uterus is kept a considerable time in water, six or eight days perhaps, the cementing jelly swells, grows in proportion, and at last comes away, or falls off in one mass. Then the internal surface of the cervix exhibits a most beautiful appearance; being variegated with projecting rugar, and innumerable intermediate narrow, but deep cavities, which lodged so many processes of the jelly. In separating the jelly, when previously macerated it had been hit for such an operation, I have seen those processes drawn out of the little cavities as distinctly as we can see a hand drawn out of a glove: and when the jelly is carefully separated and floated in clear water, it preserves its figure, and exhibits a most elegant appearance, produced by the processes that shoot out from its surface all around.

"The os uteri, or very extremity of the uterus, is in some women narrow or pointed, with a very small orifice, that will just admit the point of a very small finger; and in some it is large, soft, or spongy to the touch, granulated upon its surface, and the orifice so wide as to admit the end of the finger full half an inch up with great ease. There the passage becomes narrow, and is closed with the gelatinous cement. The os uteri, all around its passage, is crowded with small cavities, containing the fame fort of jelly, which by maceration swells, pushes out from the cavities, and comes away, leaving the cells void. This, no doubt, is part of the jelly which naturally comes away in labour. Some women have much more of it than others; and, in comparing different dissections, I have observed more of the jelly within the cervix uteri, and more likewise in the cells round the os uteri, in one subject than another.

"The uterus, at the time of three or four months, is by no means so tightly filled but that it would easily contain more. It is like a bladder therefore, so filled with water, that it would easily contain a third part more. Hence it is soft and swaggiong, and easily changing its shape, accommodates itself to the neighbouring parts.

"The situation of the uterus, which at first is in the cavity of the pelvis, but afterwards gradually rises up into the cavity of the abdomen, and the changes which its ligaments undergo, may be easily conenced by any person acquainted with the state of those parts before conception, and who has considered what has been already said about the same things in the ninth month of pregnancy.

"The peculiarities of the ovum are very different at the different periods of utero-gestation. In the earlier months the corpus luteum is considerably larger and more vascular; and within it there is a considerable and evident cavity containing a fluid. When the uterine vesicles have been injected, I have observed that the wax very easily extraveses into that cavity. On the outside of the ovum there is a little pit, which looks like a hole, leading into the cavity of the ovum. But in the cases which I have seen, no break in would pass; it appeared to be an oblitered duct, or passage grown together."

The ferox covering of the uterus, derived from the peritoneum, undergoes very considerable extension during the enlargment of the uterus in pregnancy. We have already shown that the broad ligaments nearly disappear at this time, but there is no accesion of the same kind either before or behind, as the bladder and rectum still continue to be covered to the usual extent by that membrane. The increased surface of the peritoneal coat must be considered therefore as an extension of the membrane.

"As the mucous surface of the organ is the medium of communication between the uterins and the bowels, its changes refer to the purposes accomplished by this connection. In the natural state, it exhibits merely the fine orifices of exul-
haling vessels, but after conception a large number of considerable arteries and veins pass from it to the surface of the ovum; and these are more numerous and large in the situation of the placenta than elsewhere. These communicating vessels have been described already in the article Embarvo. Towards the latter periods of gestation the vulva becomes swollen and relaxed, affording a lapse which favours its dilatation in the act of parturition.

The vital properties of the uterus, as well as its organization, are considerably altered after conception. The organ acquires animal sensibility; hence women feel the motions of the child, and even experience very considerable pain in particular positions of the fetus, hence too the sharp pains felt in parturition. We do not know whether much pain is experienced by the incision of the uterus in the cephalic section. But, supposing that it is not, the fact would not prove that the organ is not possessed of animal sensibility. Its powers may render it susceptible of some stimuli and not of others. When no circumstances interrupt the ordinary phenomena of pregnancy, we have no proof, until the natural period of this condition arrives, that the organ possesses so strong a contractile power as that which we see exerted in parturition. We might even believe that this property is not developed until the end of pregnancy; but there is no epocha of gestation, from the first presence of the germ in the uterus, at which this contraction may not be excited by the action of particular causes, which, under certain circumstances, are powerful enough to produce the expulsion of the child. Violent contusions of the abdomen, and penetrating wounds affecting the uterus, are frequently followed by abortion. Violent pallor may cause this premature expulsion of the fetus. The same effect is produced by the evacuation of the waters of the amnios, independently of any other cause; the uterus, when no longer dilated, contracts, and abortion ensues. This contractile power, with which the uterus becomes endowed on the change of its organization, partsake of the characters of animal contractility and of irritability. The inactivity of the uterine parietes, until the termination of utero-gestation, resembles, in some respects, the quiescent state of the voluntary muscles, when they are not excited by the influence of the brain; and the contraction, by means of which this organ expels its contents, can be compared only to the exertion of these muscles. On the other hand, the contractility of the uterus is independent of the cerebral influence, and its exercise is absolutely involuntary; this circumstance particularly characterizes irritability in those organs which possess it in the most remarkable degree, as the heart. Like the latter power, it may be lymphatically routed, when the action of the uterus is suspended during or after parturition; and it continues for some time after apparent general death.

The attention of physiologists has been much occupied in investigating the immediate cause of parturition; that is, the cause which calls into action the contractile power of the uterus at the end of utero-gestation. Many adopt the following explanation. They admit a species of opposition between the body and neck of the uterus, during gestation, the resistance of the latter overcoming the tendency of the former to contract. As the neck is gradually obliterated, its opposition is diminished, and it then gives way to the contractions of the body and fundus. Against this explanation we may urge that the supposed struggle between two opposing forces is purely hypothetical, that there is no evidence of any contraction or attempt at it during pregnancy, and that it comes on quite suddenly at the expiration of the term. It is this sudden exercise of the contractile power, at the end of the ninth month in the human species, that marks the term of gestation, and for which we can assign no other cause than the immutable laws by which the operations of nature are regulated. However this question may be decided, it is clear that the contraction of the uterus alone does not accomplish the expulsion of the fetus. The diaphragm and abdominal muscles assist in the operation; and hence parturition is in some degree voluntary, is accelerated in some cases by the courage of the individual, while in others it cannot be concluded without the assistance of art, in consequence of the strength being exhausted. Yet this action of the abdominal muscles is not so indispenisible, but that the uterus can get rid of its contents without their aid. We know the extraordinary facility with which parturition takes place in some women, who, in consequence of particular circumstances in their condition, exert themselves even to retard the process; and the expulsion of the child is sometimes completed at the approach of death, when the abdominal muscles can hardly be supposed to contribute.

After the expulsion of the child, and of the secundines, the action of the uterus still continues, and the organ is gradually reduced in its bulk. For a short time its parietes are in a state of increased thickness; the vessels, being compressed by this permanent state of contraction, pour out but a very small quantity of blood, notwithstanding the preceding dilatation of their orifices. This blood, effused very slowly, is soon succeeded by an abundant secretion of mucus from the surface of the uterus, constituting a species of discharge peculiar to women recently delivered, and known by the name of lochia. This evacuation lasts for a longer or shorter time, and probably does not cease altogether, until the uterus has regained its original state. The contraction of the organ is owing at first to the evacuation and contraction of its vessels; but soon nutrition is carried on in it with less activity, while absorption proceeds vigorously until the excess of matter deposited for its development has been removed.

Physiology of the Female Organs of Generation.

Puberty and Menstruation.—From the uterus of every healthy woman (at least with very rare exceptions) who is not pregnant, or who does not give suck, there is a discharge of blood at certain periods, from the time of puberty to the approach of old age (during a period in general of about 30 years); which, from the periods or returns of the discharge, is called the menstrues or catamenia, and, from the general regularity of its appearance, is termed in French les règles. The commencement of menstruation is coeval with that signal revolution in the female constitution, which indicates the power of executing the generative functions, and may be regarded as the development of the sexual life. It is therefore one of those circumstances which, taken altogether, mark the period of puberty in females. At the same time their complexion is improved, their countenance is more expressive and animated, their attitudes graceful, and their conversation more intelligent and agreeable; the tone of their voice becomes more harmonious, their whole frame, but particularly the breasts, are expanded and enlarged, and their minds are no longer engaged in childish pursuits and amusements. These phenomena have been described very elegantly by Harvey: "nece minus notam ell, quanta virgini alteratio contingit, inerecente primum et tepetatio utero; pubescit nempe, colorationem aedit. mammam protubent, pulchrior vulvus residet, splendent oculi, vox canora, inceleus, gruitus, femina, amma decora fluent."
recent and accurate inquiries. It is a general and essential phenomenon in the life of woman, and if different climates, or the varieties of savage and civilized states, are capable of modifying the phenomenon, their influence is not sufficient to annihilate it altogether, even in the frozen and inhospitable regions, where some writers have supposed that it does not occur in a constant and regular manner. It is hardly necessary to refute an opinion, which has prevailed very generally, that whole nations, particularly Americans, are not liable to this discharge. In their visits to those countries, Europeans saw numerous females in a state of nakedness, without observing any signs of the discharge, which may be accounted for by two circumstances. The women at that time are generally suppos’d to be in an impure state, and to communicate a malignant influence; they are consequently compelled to bow society while the discharge lasts, and to avoid the sight of man by hiding themselves in solitary huts. Travellers have also observed that their superficial attention to personal cleanliness, and to the modest attitude of the lower extremities, would prevent the spectator from discerning the phenomena of the catamenia. The discharge is peculiar to the female of the human species, which, in the language of Pliny, is the only “animal menstruall.” Many naturalists, says Blumenbach, and among others Buffon, have ascribed a periodical flux of this kind to some other animals, particularly of the monkey kind. But having had the opportunity of observing several individuals for many successive years, I discovered that these suppos’d catamenia did not exist at all in some, while in others there was a slight occasional uterine hemorrhage appearing at no regular intervals. (Inllust. Physiolog. sect. 37) There is a great determination of blood to the organs in animals when they are in heat; this is attended with a mucous secretion, and sometimes even blood has been discharged, so as to give rise to the erroneous notion of their being subject to the menstrual flux. Such a casual and infrequent occurrence can by no means be compared to the regular periodical discharge observed in women almost without an exception. On the other hand there are examples of women who have never menstruated, and of others, in whom this discharge has not appeared through long periods of their lives, without any ill consequence. Dr. Denman knew two instances in which the menes had never been discharged; the individuals married, but had no children. (Intro. to the Pract. of Midwifery, 4to. p. 115.) Some continue to menstruate during the time of suckling, and the circumstance is not very rare, although it is the general rule that the discharge should cease at this time. The vital powers are differently employed, and their exercitio has a different object and direction. Pregnancy almost invariably interrupts the procès. The important functions carried on in the uterus at this time require all the powers of the mother; and the adhesion of the ovum to the uterus seems to form an insuperable mechanical obstacle to the discharge. Hence Mr. Denman states that he has never known an instance of menstruation during pregnancy. The cessation of the discharge without the presence of any unhealthy cause, is the only sign by which women know that they have conceived. Authors relate many examples, however, where the catamenia have flowed during gestation; but very strong evidence would be necessary to prove a circumstance so unlikely in itself.

The menes may appear prematurely in some women, from peculiarity of organization, as the phenomena of puberty have occurred at unnaturally early periods in men; and the circumstance must be referred to original difference of constitution. Haller knew a girl of good family, nine years of age, well constituted both in mind and body, who had been subject to the regular periodical return of the catamenia for some years, without any other apparent disadvantage than that of being rather short and delicate in her make. He mentions another instance in Switzerland of a girl having a child by her uncle at nine years. Many of the accounts of menstruation in early infancy must be deemed morbid or symptomatic discharges, and cannot be referred to the catamenia. When the female constitution from any cause is disfigured to, or requires a fangious discharge, it is commonly made from the vessels of the uterus.

The early or late appearance of the menes may depend upon the climate, the constitution, the delicacy or hardiness of living, and upon the manners of those with whom young women converse. In general, the warmer the climate the sooner the menes appear. In Greece, and other warm countries, girls begin to menstruate at eight, nine, and ten years of age. According to Thevenot and Chardin they even marry and bear children at eight and nine years of age in some parts of Asia. The discharge does not appear in Europe until the female has nearly attained her full growth. Haller mentions the twelfth and thirteenth years as the usual periods in Switzerland; the discharge appears sooner in the more southern countries of Europe, and later as we approach to the north. According to Linneus, in his “Flora Lapponica,” the women of Lapland do not menstruate until a maturer age, and then in small quantities, at long intervals, and sometimes only in the summer. But if the procès does not go on according to the general prevailing rule in the country, they suffer equal inconveniences as in warmer climates, where the quantity discharged is much greater, and the periods shorter. In this country girls begin to menstruate from the fourteenth to the eighteenth year of their age, and sometimes at a later period, without any signs of disease; but if they are luxuriously educated, sleeping upon down beds, and sitting in hot rooms, menstruation usually commences at a more early period.

The variety in the time at which women arrive at puberty has given rise to some moral deductions. It has been assigned as the reason why women in hot climates are almost universally treated as slaves, and why their influence is so powerful and extensive in cold countries, where personal beauty is in least estimation. In hot climates, women are at the height of their beauty when they are full children in understanding; and, when their understanding is matured, they are no longer the objects of love. In temperate climates their perfections and their minds acquire perfection at the same time, and the united power of their beauty and faculties is irresistible.

At the approach of old age women cease to menstruate, but the time of the cessation is commonly regulated by the original early or late appearance of the menes. About the fortieth year, a little sooner or later, the regular periods of the catamenia are interrupted; and before the fiftieth year, profuse discharges occur followed by long intervals; about the time just mentioned, the catamenia generally cease, and the power of reproduction is lost. With those who began to menstruate at ten or twelve years of age, the discharge will sometimes cease before they arrive at forty; but if the first appearance was protracted to sixteen or eighteen years of age, independently of disease, such women may continue to menstruate until they have passed the fiftieth, or even approached the sixtieth year of their age. In this country, the most frequent time of the cessation is from the forty-fourth to the forty-eighth year, after which women never bear children.

By this constitutional regulation of the menes the propagation of the species is, in every country, confined to the most vigorous
vigorou part of life, and, had it been otherwise, children might have become parents, and old women might have had children, when they were unable to supply them with proper or sufficient nourishment. Yet the rules just mentioned are not free from all exceptions. The catamenia, with powers of fecundity, have continued in particular instances much beyond the age we have specified. Some of these have had regular catamenia; in others, after a long suppression, the discharge has returned. We must be careful, however, here, as in the case of premature appearance, not to confound with the menstical accidental and morbid hemorrhages. A relation of Halber's has had two sons after her fiftieth year, and in colder countries, where the access of puberty is late, children have been born when the mother was even above 60.

The proper menstrial blood is generally preceded, sometimes even for some months, by a whitish fermen fluid. Symptoms of more or less violence, indicating the accumulation of blood about the hypogastric vessels, such as pain in the loin and about the pelvis, latitude with painful affections of the lower extremities, and various nervous and hysterical feelings, are then observed. Pains in the head, shuffling of the cheeks, and even simply appearances in the face sometimes take place. In younger virgins these symptoms are milder, and in the female instances often go off spontaneously; but they return with greater intensity, attended with considerable colic pains, and quick and strong pulse, until a bloody fever, and then more genuine blood flows more or less rapidly from the vulva. The duration of the flux is uncertain; it may be accomplished in three or four days, or be protracted till the seventh or eighth. The quantity is subject to no settled law; it is greater in warmer countries, where it may amount to a pint or more; while in colder regions it does not exceed five, four, or three ounces. Yet, says Dr. Denman, lib. cit. p. 118, "there is a common quantity, to which, under similar circumstances, women approach, and it may be estimated in this manner. Supposing the quantity to be about eighteen ounces in Greece, and two ounces in Lapland, there will be a gradual alteration between the two extremes, and in this country it will amount to about six ounces." Manners and way of life make a considerable difference. Luxurious and lascivious women have a more copious discharge; while those who take much exercise, or are weak or insufficiently nourished, furnish a more sparing quantity. The pain subsides as the discharge proceeds; the inflammatory symptoms about the uterus go off as the determination to that organ ceases, the pulse is diminished, and the blood is followed by a serous fluid. Signs of debility succeed, with a hollowness about the eye, and a dark circle surrounding the organ. The first appearance in a young girl is generally followed by an interval of some months, and this period approaches gradually to a year; so that a healthy woman, in whom the discharge is established, will have it return on the same day of the month for many succeeding years. If seven or eight days are occupied by the flow of the catamenia, there is an interval of twenty-two to twenty-three, making up the menstrial period. Such is the course observed in healthy temperate subjects, whose bodily and mental powers are not abated or overtrained. Improper regimen and manners may precipitate or retard the discharge. Luxurious manners, with high living, may occasion returns after fifteen days; under various other circumstances there is a similar protraction of the period, which recurs however at regular intervals. Similar symptoms to those which attend the first menstruation, but in a milder form, accompany each return. In this respect considerable varieties are observed; the affection recurring with considerable violence, at every period, in some women, while others do not seem to suffer at all.

The nature of the discharged fluid has not been ascertained by any accurate investigations, but its obvious characters are so exactly like those of blood, that it has been generally considered and called blood. This remarkable difference, however, at least, seems to distinguish the two fluids; viz. that the catamenia do not coagulate. They are blood deprived of fibrine. Coagula are sometimes seen, but are considered to denote unhealthy menstria, as they occur when the procès is obviously disturbed, and attended with great pain, &c. Opinions have been very generally received that the menstrual discharge possesses those peculiar malignant properties. These notions seem to have originated in the East; they appear in all their force in the ordinances of the Jewish legislator, were adopted by the Arabian physicians, and have been credited in most countries. The severe regulations which have been made in some countries, for the conduct of women at the time of menstruation, the expressions used, the dispersal of the blood discharged, or of any thing contaminated with it, the complaints of women attributed to its retention, and the effects enumerated by grave writers, indicate the most dreadful apprehensions of its baneful influence. The following quotation exhibits these absurd notions in very elegant language. "Penis cum menstruato consubstantiis excoriatur; in nova vita eo tangatur, in perpetuum levitatur; flerides hunc tote fruges; moritur infanta; exuvatur扭矩torum genitum; in mulier preparata alternus menstrua supergregatur, aut illis circumstaret, aborvat factur; elautern, quod uterum gemet, conceipient ipsi admittur; purgatant spuitur, et vapurare speciosa aquo erit nitorum obtrahatur. Julians hic fanguis canes in rabiem agit, homines vero hirs cruciatus affligit, comitalem meruim, polum effuat,айте echantlosem vita inducit; idcirco a veteribus itiner venena relatis; pari malignitate exsanguatur, atque fanguis echantse petus." De Graaf.

Under peculiar circumstances of health, or states of the uterus, particularly in hot countries, if cleanliness be not observed, and the evacuation take place slowly, the discharge may easily become acrimonious and offensive. But there is nothing of this kind belonging to healthy menstruation in a cleanly woman, where the effused fluid differs from any other Blood only in the circumstances already mentioned. Nay, when the catamenia are chronicled in the body for many months, in cases of imperforate vagina, they produce no ill effect whatever, and are distinguished by no particular odour or offensive qualities when discharged by an operation. We have, therefore, no reason for thinking otherwise than that this discharge is of the most inoffensive nature.

That the catamenia come from the uterus is tolerably evident from the change in the lining of that organ during the period of their flow. It is purchased under softer and more vitious; and exhibits bloody spots, with hemorrhages, from which the fluid may be expressed. The appearance of the menstrual blood in its cavity during the period is a further proof; to which we may add the suppression of the discharge in various morbid conditions of the uterus, and in pregnancy, where its surface is occupied by the adhesion of the ovum. Direct evidence of the fact is furnished in cases of prolapsus, where the fluid may be actually seen distilling from the os uteri. To these arguments we may add the obvious connection of the menstrual flux with the functions of the uterus. Some have contended that the vagina is partly or wholly the source of the catamenia; but the opinion rests on no sufficient ground: the structure and functions
functions of the vagina, as well as the direct evidence of facts. Strongly oppose the opinion.

Whether the menstes come from the arteries or veins of the uterus has been a point of discussion with physiologists; and also whether it be a simple effusion of blood from the vessels or a secretion. The structure of the organ refiects that of glands, and the appearance of the blood, on many occasions, differs widely from mere blood; which indeed it never refiects entirely in the healthy state; so that we are disposed to consider it as a secretion performed by the uterus like fluids that are formed by other glands. A circimstance is sometimes observed in this process, which must be referred to the secreteory action of the uterine vessels. This is the discharge of a membrous fulblance, of the figure of the uterine cavity, smooth on one surface, and flocify on the other, and much refembling the decidua on the whole. The fact is mentioned by Dr. Denman, who first saw it in married women, and afterwards in unmarried ones under circumstances which proved undoubtedly that it was formed independently of cohabitation or communication. The menstruation has been painful in all these cases, and conception has never occurred while the habit remained.

The efficient cause of menstruation has afforded an ample field for those who delight in speculations and hypotheses. As the periods of the moon agree nearly with those of the discharge, the influence of this body has been referred to in explanation of the occurrence. If we admit the solution, the effect of lunar attraction ought to be very different in the various relative positions of the moon and earth; but the observation of several individuals will immediately shew that there is no day of the month in which feveral do not begin to menstruate, and that the moon's apace or perige has no influence at all in this respect. We shall see, too, that the discharge begins in some, is diminished or entirely ended in others, at the very same time; consequently that the moon can have nothing to do with the matter. Moreover, as the menstrual period rather follows full moon, the same woman menstruates at one time in the new moon, and at another in the full moon. The existence of some ferment, causing an interline motion in the vessels of the part, meets now with no advocate. Local or general plethora have been alligned as the reasons of the menstes, and many of the circumstances which accelerate or increase, or on the contrary retard and diminish the flow, favour these opinions. But we still cannot adopt the opinion; the loss of several times the quantity of blood previous to or in the very act of menstruation, from the arm, or any other part of the body, does not prevent or interrupt the flowing of the menstes; and in those complaints which arise from their obstruction, greater relief is afforded by a few drops of blood from the uterus itself, than by ten times the quantity from any other part. A curious circumstance must be noticed respecting the effects sometimes produced by obfructed menstes; viz. that their place is supplied by periodical emissions of blood from various other parts of the body, as the nose, lungs, ears, eyes, breasts, and almost every other part. These probably should be deemed in many cases rather as discharges belonging to some disease under which the patient may labour, than as connected with menstruation. Hemorrhages of every kind, in either sex, are frequently referred to be periodical.

That the catamenia are a secretion from the mucous lining of the uterus, of which we cannot understand the direct mechanism, any more than the method in which any other secretions are performed; and that we are ignorant of the causes which determine their appearance to the monthly period, seem to be nearly the limit of our knowledge on this subject. It is clear that the procexs, being a part of the healthy operations of the organ, and therefore indicating its general condition, is necessary to preserve the uterus in a state fit for conception. Observation has fully proved that women, who do not menstruate from the uterus, or who are not in a state disposed to menstruate, cannot conceive, even though they should have a periodical discharge of blood from any other part of the body. All animals, at the time of their being fruculous, or in a state fit for the propagation of the species, have a discharge, analogous and perhaps equivalent to menstruation, which is generally mucous, but in some instances, in any hot feasons and climates, becomes fanguineous.

That the menstrual blood contributes to the formation or nutriment of the fetus may be reasonably doubted. The time of the discharge is not the most favourable to conception, which occurs most readily just after the period. Since all animals, whether they menstruate or not, supply the offspring of conception with nourishment of a proper kind, and in a sufficient quantity to bring it to perfection, we may conclude: that the end is accomplished by some more common principle. The mucous discharge from the generative organs of animal proofs that they are in a state favourable to the propagation of their species; and the catamenia prove the same circumstance in woman.

From the time when the phenomenon of puberty announce the aptitude of the female for the exercise of her sexual functions, the generative organs exert an influence which modifies the whole organization, and beflows on woman the most ftriking traits of her physical and moral character. The various revolutions to which her constitution is subject, the nervous affections, the frequent returns of indisposition and suffering, the strange and unaccountable anxieties and caprices, and sometimes the increased acuteness of the imagination and judgment; all depend on this influence; and if it be true that man is made only at certain times, while woman is female during her whole life, it must be attributed chiefly to this cause. It is this that constantly receds woman to her sex, and marks her whole existence with so characteristic a physiognomy. We shall not be surprised to find, that a cause of such power and extensive influence is liable to irregularities which have very marked effects on the constitution. When the new powers with which the organs are endowed exceed the joint standard, and deviate into a kind of unnatural irritability, they affect sympathetically the whole frame, and particularly the nervous system. This, in an extreme degree, constitutes morbus uteri. Generally, however, this excessive vitality of the sexual organs, without going to such an extent, produces various inflammatory and nervous symptoms, constituting what are called hysteric disorders, and arising evidently from the artificial and forced state of celibacy. These affections are removed by marriage, which re-establishes the balance of the various functions by giving its natural employment to an organ, whose excessive sensibility deranges the whole system. Other and very various phenomena may be referred to the same cause; and those physicians who have collected, in particular works, observations on the diseases occasioned by celibacy, or by the imperfect and unnatural enjoyments of the coitator, present us with an alarming catalogue. "Ut reliqui hiimuli a natura dati nobisque foentrum, ita et veneris albitatem, ut natura immutabatur, ipse ipse defcitur. Ipsa anima ex defiderio venerei languent et perirent. Cyprini ex retinis ovis laborant. In faecis additus, de quibus fevera religio venerem arcert, multa, parum cognita, neque fama morborum generae vigore idoneus audior exaltat. Frequentem ex potentillii, quae veneris dulcedinem degustantur, quae nunc preventur, in chlorofin, in hyaterico male, in convulsiones,
fiones, in maniam, in furorum uterum incident; quam nec femel vidis inque carum femorum aperits cadaveribus fecini, et fractomata, & hydropes ovarii repetiturum. Quare, nihil mortuorum culludia vprove, ea mala pleuraque, et uterorum uteri, et vera mania, veneris fu fulvuntur. Haller, Elem. Physiol. t. 3. p. 14. We may affirm, in short, that from the time when the organs, which characterize these amiable and sensible beings, are fully endowed with all their vital powers, woman is constantly subject to their influence, until the period arrives when she is no longer capable of the life of the species, when she has passed through the revolution of her latter age, and enjoys quietly her individual life, during the remainder of which women suffer much less, in every respect, from the other sex.

A delineation of the effects, which the physical changes occurring at the time of puberty produce on the moral character and ideas of women, may be seen in the eloquent work of Cabanis, "Rapports du Physique et Moral de I’Homme." The various morbid derangements of the menstrual process will be considered in the medical department of this dictionary.

The generative process is subject to very different laws in animals and in the human species. In the former, particular feasons of the year are appropriated to these functions, and the organs undergo certain physical changes, by which they are rendered fit for the process. It is a peculiarity belonging to the human race, that they are confined to no season in exercising these functions. Moll animals, and particularly birds, copulate in spring; and that want of health which has much influence in the affair is evident from this, that animals of warmer countries seldom copulate or are fecundated in Europe. Perhaps women conceive rather more frequently in spring; at least, accoucheurs have observed that there are more labours in the months of December and January.

As the effect of sexual communication is so important, it cannot be indifferent to the design of nature to what part of the uterine system the semen should be conveyed. It admits of no doubt, that it either remains in the vagina, passes into the uterus, or else extends its course along the Fallopian tubes to be applied to the surface of the ovaries, which stimulate, and from which the new animal derives its existence; but the question whether it be one or other of these, has given birth to more physiological controversy than perhaps any other operation of a living animal. Those who have entered the lists have ranged themselves either on the side of application of the semen to the ovaries, by means of the tubes; or on that of the intality of this process. These latter contend for an absorption of this fluid by the vagina, and a peculiar excitement of the whole frame ana consequence, of which excitement the changes produced on the ovaries are to be regarded as the local effects. The advocates for the first opinion allege, that the semen has been found both in the uterus and tubes, and quote as their authority the observations of Morgagni for the former, and Ruyfch for the latter. When seen in this last situation, some have thought that it was conveyed thither by the muscular power of these parts, in the manner of a peristaltic motion, beginning at the uterus, and ending at the amnioned termination of the tube; and when at this level, it was supposed that the semen was applied to the surface of the ovaries, and impregnated them by actual contact. Various analogies, drawn from the animal and vegetable kingdoms, have been adduced for and against these different opinions; but such arguments must be received with caution. Where different instruments are employed to produce the same ultimate effect, we may reasonably conclude that the means used are essentially different. On this principle no direct conclusions can be drawn respecting

the human species, from observations either on vegetables, or even on frogs, toads, and newts. The impregnation of birds, being effected by semen conveyed into the body, resembles that of the human subject more than the former, but they differ so widely in the mode of perfecting the fetus from the ovum, that we cannot rest with much confidence on their general analogy.

To the observations of Morgagni and Ruyfch a numerous train of facts has been opposed, ascertained by the experimental labours of Harvey, Du Graaf, Haller, and others, in which no semen was ever seen beyond the vagina in animals, examined at various periods after coition. One experiment of Haller, on a sheep, constitutes a single exception to this observation: he once saw semen in the uterus forty-five minutes after coition. These facts bring the advocates for the necessity of a contact of semen with the ovaries into a dilemma, from which they attempt to extricate themselves by contending, that fecundation does not require the application of semen to the ovaries in a palpable form; but that there is exhaled from it a subtle fluid, in a vaporific state, called aura feminals, and that the contact of this vapour is sufficiently sufficient to impart to the ovaries their discretion of stimuli.

The opinion, that the presence of the semen in the vagina alone was sufficient to account for impregnation, was defended by the statement of caes, in which, from some anatomical peculiarities, it seemed almost impossible that the fecundating fluid could be conveyed into the uterus; yet in several of these cases impregnation really took place. Those who hold a contrary opinion either call at the accuracy of the statement, or draw a different conclusion. In order to throw some light on this subject by direct arguments, Dr. Haighton undertook a series of experiments, the results of which are detailed in the 8th vol. of the Philosophical Transactions. He divided the tubes which form the cornu uteri in rabbits, and admitted them to the male, when they had completely recovered from the experiment; but this operation seemed to destroy entirely not only the power of conception, but also the disposition to employ the means. After several ineffectual trials, he varied the experiment by dividing one tube only, and in many instances the animals conceived afterwards. Corpora lutea were found on both sides of the body, but fetuses only on the sound side. If the former bodies are produced only after conception, which the doctor assumes, then conception must have taken place here, although the direct access of semen to the ovarium was interrupted; for the operation in question completely obliterates the tube. It must be acknowledged that the proof is incomplete in these cases; we cannot justly assert that conception has taken place, when no fetus was formed. Dr. H. attempts to elude this objection, by showing that the division of the tube at any period after coition, but before the passage of the germs from the ovary, will equally prevent the appearance of fetuses; accordingly no fetuses were seen in the tube, when it was divided as late as forty-eight hours after coition. But if the operation be performed until the time at which the rudiments of the new animal have passed into the tube, the actions of the parts furnish no interruption, and fetuses are formed in the tube of the mutilated side. "If," adds the Dr. "the ovaries are susceptible of their proper excitement only from the contact of semen, how did it happen that the effects of that excitement were not more obvious where nothing had been done to intercept its course for 48 hours, than in those where all communication between the uterus and ovary had been cut off before the means of impregnation had been employed? I think it must appear, on tracing nature's

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... through the different stages of this work, that they are the product of that law in the constitution, which is called sympathy or consent of parts. That the semen first stimulates the vagina, uterus, cavity of the uterus, or all of them. By sympathy the ovarian vessels enlarge, project, and burst. By sympathy the tubes incline to the ovaries, and having embraced them, convey the rudiments of the fetus into the uterus. By sympathy the uterus makes the necessary preparation for perfecting formation and growth of the fetus. And, by sympathy the breasts furnish milk for its support after birth.

Physiologists have certainly not yet ascertained, by direct observation, whether or not the semen enters the uterus and tubes; and consequently all explanation of the mode in which it co-operates in conception must be, in a great measure, hypothetical. If we cannot speak from actual knowledge on a point, which must be so important as the present, in the generative process, and the determining of which must be so essential towards forming right notions of the nature of the business, how uncertain must our representation be of the more intricate and obscure parts of the subject!


The circumstances just described do not appear to be essential to the business of fecundation; they contribute to the important object of reproduction in a secondary manner. The strong desire implanted in all animals, and the physical gratification experienced in its indulgence, ensure the union of the sexes, and consequently the continuation of the species. The celebrated Spallanzani has given to the world a very interesting series of experiments, by which it is proved that impregnation in many cases may be effected by artificial means. He proved the first in the case of various amphibias, as the frog, newt, and tadpole, and afterwards in the bitch. He experimented on a spaniel bitch, which had before had whelps. He confined her very closely until she was in heat, and then proceeded in the following manner: "A young dog of the same breed, nourished by me, from a spontaneous emission, with 19 grains of feed, which were immediately injected into the matrix, by means of a small syringe introduced into the vagina. As the natural heat of the feed in animals of warm blood may be a condition necessary to render fecundation efficacious, I had taken care to give the syringe the degree of heat which man and dogs are found to possess, which is about 30°. Two days after the injection, the bitch went off her heat, and in twenty days her belly appeared swollen, which induced me to let her at liberty on the twenty-sixth. Meanwhile the swelling of the belly increased; and sixty-two days after the injection of the feed, the bitch brought forth three lively whelps, two males, and one female, resembling in colour and shape not the bitch only, but the dog also from which the feed had been taken." (Dissertationes, vol. ii. p. 256.) The experiment was repeated with success by Dr. Rossi, ibid. 476.

We have an account of a similar trial in the human subject, made at the suggestion of Mr. Hunter. It was in an instance of malformation, where the urethra opened in the perineum. "Under these circumstances the person married. When he had connection the emission was complete, which proved that the vesicles were perfect, but the semen always passed out at the perineum. The late Mr. Hunter was confused to remedy, if possible, this inconvenience, and to enable the person to begot children. He advised that the husband should be prepared with a syringe fitted for the purpose, previously warmed; and that, immediately after the emission had taken place, it should be taken up by the syringe, and injected into the vagina, while the female organs were still under the influence of the coitus, and in the proper state for receiving the semen. This experiment was actually made, and the wife proved with child. On a subject of this kind it is proper to speak with caution; but, from all the attending circumstances, no doubt was entertained by Mr. Hunter, or the husband, that the impregnation was entirely the effect of the experiment." Home on Hermaphrodites, in Philos. Transact. for 1799.

Various circumstances have been enumerated, as proofs that conception has taken place; as peculiar feelings during coition, horripilation, and even fluid dentium, &c. Haller's sensible remarks on this subject seem to us to be nearer the truth. "Hae omnis quidem nihil nisi videntur, et difficillimam expertum. Neque enim feminis, dum maritus admissit, otiose et ad experimentum anima; neque, nisi longo abhine tempore nonit ferrare fac concepisse, quando jam eujusmodi phemenon membra clapsa fiant. A feminis certe, qua quis verum poteram expectare, nihil de horripiliatione, neque de dolore potu diferire." Ibid.

The opinions concerning the effusion of a seminal fluid by the female, and its mixture with that of the male, are altogether imaginary. That a mucous fluid is sometimes poured out in coition, from the apparatus already described in the external organs and the vagina, is undoubted; but this happens only in infertile women, or such as live luxuriously; it consists merely of mucur, and is discharged externally, instead of passing into the uterus.

Circumstances do not admit of the internal changes which accompany and follow copulation and conception, being accurately ascertained in the human subject; and, consequently, these have been investigated in various animals. Mr. Cruikshank gives the following description of the parts in a rabbit at heat. "The orifice and internal surface of the vagina are as black as ink from the great determination of blood. The ovaries had, under their external surfaces, a great number of black, round, bloody spots, somewhat less than mulberry seeds. These black spots are the cervices or cups which secrete the ova; they are extremely vascular; the ova themselves are transparent, and carry no visible blood-vessels. These cervices, on the expulsion of the ova, enlargé and become yellow, projecting above the external surface of the ovaries, and form the corpora lutea: a certain mark of conception in all quadrupeds, and in women themselves, whether the embryo is visible or not. The use of the corpora lutea is not yet made out; but the orifice, through which the ovum bursts into the Fallopian tube, is often extremely manifest, and always has a ragged border, as lacerated parts.
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usually have. The Fallopian tubes, independent of their black colour, were twisted like writhing worms, the peristaltic motion still remaining very vivid; the fimbriae were also black and embraced the ovaria (like fingers laying hold of an object), so closely and so firmly, as to require some force, and even laceration, to disengage them. Haller and other observers support this statement of the erection of the tube, and its close application to the surface of the ovarium. But Dr. Haighton seems not to have found it out until a later period. He examined a female rabbit in high season a few minutes after coition, and found the fimbriae in their natural situation. He found, moreover, from a regular series of observations made on different rabbits, at every hour between the first and the ninth, that the fimbriae remained nearly in their usual situation; and the only difference he noticed in the last hours was a greater turgescence of vessels, as if preparatory to some important action. That the prominent vessels or calyces of the ovaria, already mentioned, burst, and allow something to escape into the Fallopian tube, which conveys it to the uterus, is what all observers seem to agree in: and they concur, moreover, in representing the corpora lutea as produced by a particular process carried on in the empty ovarian calyces, and consequently, as exhibiting incontestible proofs of impregnation having been effected.

These circumstances have all been ascertained by the observations of animal bodies, and transferred by analogy to the human subject; in which, indeed, the formation of a corpus luteum is very evident, although the earlier stages of the processes have not been traced. Observers by no means agree as to the time at which these changes are effected. Mr. Cruikshank represents the bulging of the calyces as following a fruitful coition very speedily. "I opened," says he, "a female rabbit two hours after the last received the male; the black bloody spots just mentioned now projected much above the surfaces of the ovaria; none of the ruptured orifices were just visible; but in many of these spots there was not the least viscid of an orifice; whence I conclude that they heal very quickly in general." The narrative of Dr. Haighton's experiments would lead us to conclude that this escape of the germ from the ovarian calyces does not take place till a much later period. In twelve hours after coition "several of the vessels evidently projected; they had lost their transparency, and became opaque and red. When punctured a fluid of the same colour escaped. The corpora lutea, which are formed by the thickening of the parietes of the vessels, were not very evident." At 24 hours after coition the fluid in the vessels was similar to that of the last experiment. They projected more evidently, and their thickened parietes, manifesting the commencement of corpora lutea, were become more apparent. At 48 hours past coition, the vessels formed to be in the very act of bulging, and a semi-transparent substance of a mucous-like consistency was beginning to protrude from some of them; others, indeed, were less advanced. The imbricated extremities of the Fallopian tubes were preparing to receive their contents, as appeared by their having quitted their usual position, and embraced the ovaries in such a degree, that only a small portion could be seen until the tubes were taken away. Sections being made into the thickened vessels, the formation of corpora lutea appeared to have made further advances. From the appearance of an inipient rupture of the vessels in this experiment, it was but reasonable to expect that their contents would soon have escaped. In two days and twelve hours after coition the fatal rudiments had escaped; but the cavity of the ovarian vessels had suffered but little diminution. Brittle were easily introduced by the ruptured orifices. In this experiment the advances towards the formation of a perfect corpus luteum were such as the period of examination would naturally lead us to expect. The contents of the vessels having escaped, it was but reasonable now to look forwards to a speedy oblitera

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voked per annum. Lastlv, the germ may be detained in the Fallopian tube, without arriving at the uterus. The structure of the part does not allow it to dilate sufficiently to contain a full-sized child, and it accordingly hurries, in general, long before that time, and the patient perishes from bleeding.

We must allow, that the escape of any thing from the ovarium in the human subject, or other mammalia, is rather inferred than directly proved; and that we cannot see the germs in the Fallopian tube, on their passage to the uterus; so to obscure a fact are the rudiments of the future animal at the time, and immediately after conception.

The appearance of the corpus luteum as the consequence of a fruitful copulation; but there is some doubt whether the latter circumstance be an essential condition of its production. It is well known that birds lay eggs without the concourse of the male, and such eggs are unproductive. Valeriani affirms, that he has seen corpora lutea in the ovaries of virgin unreared, and Blumenbach appears, in the following quotation, to agree with him in opinion on the subject.

Porro autem non minus verum et inapptas aves ejusmodi, ova subventanæa ex mecanica titillatione generatioe concipere poeif, quod quidem physiologicai comparati, adeoque omnis zoologiae vere scientifica pares Areoliteæ et pretentiæ fecundittimini. Harveus animadverrit, quorum hic adem luminosissima inter aenem esse afferunt, ut quidem dans unum folium lingering tangas, flatum procurebat, et ordinum uterum audent exceptorem, quod ilbunde ingrido denumeris, vago rumore, alabrumque gelationum. Gratam veneris dah-cedem eadem exprimere quin etiam fercellus ova inde concipere, in turdo, merula, aliquac fe officia expeterum. Iam de puttario referit, quem utxor ejus dux in delietibus haberat, frue brevem habitation um et faeces etur in ovario vehilis effectum esse reor, fetivi est viri amplexus, vixo leio quodam artificii excussit. Quadrant in eam spicularem, quis dixamus circumstantiae, sub quibus corpora lutea in inapptam obscurabunt anarchists; atas fulfilent, a dueto quarto indo. terno, flagrant quorumdam afflictor, &C. Nam cliam quoque aliquo alinumor, decidere non audito, annotatis tocrinum, quo dicatur aliquo hactenus appat auctores occurrent ejusmodi baud infidem cati eaus, eos non indi in Italicis virginibus observatos fulle. Specimen physiologicai comparati, Gotting, 1789, p. 42.

Physiologist has endeavored whether a second impregnation can take place after a fruitful copulation. Instances of twins, born with different degrees of development, have been considered as proofs of Superfetation. The reasoning does not seem very conclusive, the fact does not clearly prove that the two fetuses were conceived at different and distant periods, since the growth and development of one germ may have been prevented by various causes. The question is, whether a woman, having only a single uterus, can conceive two or more months after a fruitful copulation; and at present we have no facts to prove the affirmative, while presumption is strongly against it. The thing appears more easy, if we suppose the two conceptions to be separated by a very short interval. Thus we can conceive that the Americam lady mentioned by Buffon, who received the embraces of her husband, and of a negro slave, in the same morning, may have brought forth twins of different colours.

On the subjects of the preceding paragraphs, the reader may refer to the ample collection of facts, in the eighth volume of Haller's Elementa; to Spallanzini's dissertations relative to the natural history of animals and vegetables, vol 2d.; to Haighton's experimental inquiry concerning animal impregnation, in the Philosophical Transactions for 1797; to Cruikshank's experiments, in which, on the third day after impregnation, the ova of rabbits were found in the Fallopian tubes, and on the fourth day after impregnation in the uterus itself, with the first appearances of the fetus; ibid.

The various opinions concerning the source from which the new animal is derived, and the manner in which its formation is effected, form the last subject of the present article. In the science of life, as in all others, the speculations and hypotheses concerning any matter are in an inverse ratio to the number of ascertained facts; and perfons are disposed to talk more, in proportion, as they know less. Hence the vast abundance of theories of generation, which almost exhausted the patience even of Haller, and extorted from him the following very sensible observations. "Iterum ingratiatum mili impendit opus, feriher de ipsis, quia multae natura circumjectis tenebris velata, fenestrum hic inaccesse, hominem agitantur opinionibus; est deis non modic congresso, in quibus quidquid, ubique quidque, id autem parvis, in quo animus, in quere aliquid fundamentum, adequiteat. Erunt libranda cum phenomenis contrarioribus, cum argumentis contra argumenta, ut demum nihil docet certum, quam nihil me docere. Et eum tamen etiam in deprecatione de problemati solutione fund utilitas, proximumque eil vero, nihil docere, quod furtum fit." The first subject of our inquiry will be, from what quarter the materials of the new animal are derived; then, by what cause those materials are formed into an animal, such as we have shown to be produced in the female by conception. The opinions concerning the source of the offspring may be reduced to three; one gives to woman only the humble office of affording a proper nidus for the due evolution of the fact, which, according to this theory, already exists in the male semen, and requires only a fruitful habitation. Another directly reverses this position; it puts the female in possession of every requisite for the formation of a new animal, and considers the male a mere instrument of the operation of the fetus, which, according to this theory, already exists in the female semen, and requires only a fruitful habitation. The third gives no pre-eminence to either sex, but, with the mutual embrace, suppresses a mutual effect to be produced; it regards both the male and female, as concurring essentially in the work of reproduction, by each affording a something, which, when united under proper circumstances, becomes the proximate cause of impregnation.

The ancients admitted a seminal liquor in both sexes, and concluded, not unnaturally, that the fact was formed by the union of these. Hippocrates and Aristotle held this opinion, and conceived that the sex of the offspring depended on some predominance in quality of one or the other fluid. However obtuse the mode of this mixture may seem, specious arguments are not wanting in support of the opinion. The necessity of the co-operation of the two sexes, in producing a fetus, in almost every instance in the animal kingdom, may be alleged in favour of the doctrine. Also the existence of different sexes in almost all plants; the fecundating power of the male duct, and the perpetual presence of the seed before fecundation; which, however, remains unfruitful without the influence of the former. The resemblance...
blame of the fetus to both parents in the human race, in animals and even in plants, may be urged in support of the same doctrine.

The old opinion, which supposes that males are produced by the right testis and right ovary, and are contained in the right side of the uterus, while females are formed on the left, is delusory of all foundation. A male with one testis has produced children of both sexes; and male or female fetuses are seen indifferently in the right and left common uteri of animals.

The hypothesis of Hippocrates and Aristotle was adopted by Buffon, and is presented in his natural history with all the advantage it can derive from his warm imagination and eloquent diction. But figurative language recomposes us very imperfectly in scientific matters for want of observation, and hasty generalizations; and the theory of Buffon is so delusory of foundation, that we can hardly think it worthy of notice. He conceives that there is a matter in nature, composed of incorruptible molecules, always living and active, and defined to the nutrition and evolution of all organized beings. These particles are received in the food, and are applied to every part of a plant or animal. Every animal is an interior mould, by which these particles are fashioned to their particular shape. When there is more of this matter than is required for purposes of nutrition, the surplus is conveyed from all parts of the body to the teatles of each sex, which are its referrers. It exists here in a liquid form, and contains molecules analogous to all parts of the frame, sufficient to form a smaller being, exactly similar to the large one, from which it is produced. The molecules composing the new being are analogous to those of all parts of the body, from which they have been conveyed to the teatles, and may be deemed a kind of extract of the old body. This matter, having passed through the interior mould, and finding the uterus in a favourable state, generates a new animal. We shall not abuse our reader's patience by the further detail of such vague chimera: they more than justify the farce of Voltaire in his "Homme aux quarante cens." 

"Ah! monsieur le fantais, says the man aux quarante cens, could not you inform me how children are made? no, my friend! replies the fantais; but I will tell you what philosophers have imagined on this subject, or, in other words, how children are not made.

This defêit contains a lively ironical account of the various theories of generation, which the reader will find much more entertaining, and quite as instructive as the original accounts of these reveries.

Of these, who consider that the father has the principal share in producing the child, Leuwenhoek is the foremost. He considers the spermatic vermiculis as men in miniature; and conceives that one of these crawls in some way or other into the ovarian vehicle, and is there developed.

That the fetus is produced by the mother has been more generally supposing; and seems more probable on the first glance, since the child most certainly comes from the mother, although it is by no means clear that it ever went to her from the father. The analogy of almost all animals, and of plants, favours this opinion. The generation of the aphides has been adduced in its support; where a single fecundation suffices for several generations. In the frog and tad, and in the bird, it is very clear that the fetus pre-exists in the ovary; and that the contact of the female produces at first no perceptible change in its appearance. Indeed the wonderfully small portion of fecundating fluid necessary to produce the requisite effect in the frog or tad would lead us to conclude too i cannot excite any very great change at the first moments of its application; and this circumstance, together with the obvious existence of the something, which is afterwards evolved into a tadpole, in the ovary before copulation, clearly proves the pre-existence of the germ in the females of this species of animals. 

"A quantity of seed," says Spallanzani, "far more incomprehensible than we should ever have imagined, is sufficient to animate a tadpole. We have seen that it is not necessary to cover the fetus completely with this prolific fluid; a drop will suffice. Further, three grains mixed with twelve, and with eighteen ounces of water, communicate to every part of it the power of fecundation, since tadpoles placed in any part of the mixture are fecundated. The three grains of seed must therefore have been diffused through the whole mass of water. But, what an enormous division of its particles must such a division occasion! How small a share of prolific liquor must fall to the share of each tadpole! Yet there are facts which prove that the semen still retains its virtue after this excessive division; for I have found a globule 1.5-3ths of a line in diameter, taken out of a mixture of three grains of seed with eighteen ounces of water, was often capable of fecundating a tadpole. Deprived of knowing the proportion, which the tadpole (that of a frog is 2-3ds of a line in diameter) bears to the particles of seed diffused in a drop of this dimension, I have found, on calculation, that it is as 100 to 187,777,777 to 1. How infinitely small, therefore, is the quantity of seed in comparison with the bulk of the particles, which it fecundates! This deduction led me to calculate the weight of the particles of semen diffused in this drop of water: it is 10,714,714 of a grain. That I might view these particles under every possible aspect, I reduced their bulk to cubic lines, when it appeared to be about equal to the volume of a cubic line."

Dissertation, vol. iii. p. 212. The researches of Haller, and of others on the formation of the chick, have clearly proved the pre-existence of the fetus in the female of birds.

But, although this hypothesis appears to be supported by the most numerous and satisfactory proofs, there are difficulties opposed to its adoption. "It is very certain," says Haller, "that children often resemble the parents in the human race; so that you may distinguish one brother by his resemblance to another, or know a fun by his likeness to the father or mother, or even to his grandchild or grandson. All the individuals of some families are characterized by particular lines of countenance. My own family have now been distinguished for tallness of stature for three generations, without excepting one out of many grandsons descended from one grandfather. Families of red-haired persons are not uncommon: the disagreeable color being derived from the father or mother or grandmother. But this resemblance of children to parents is deriv'd most plainly when there is any defect or peculiar formation transmitted from one to the other. The traits of the face may perhaps not be deemed surprising, since nobody denies that the traits of fluids is derived from the mother; but the father contributes the smallest drop possible, if any. Yet we find various defects, or dispositions to disease, passing from either parent to the offspring. This is matter of common notoriity with respect to gout, rheumatism, infirmity, feebleness, consumption, &c. but there is more doubt of some others, as catalepsy, hemer, aneurism, squinting, hardihood, chub-foot, futility, &c. of which, however, authors relate many examples. We know a very remarkable influence of two noble females, who got husbands on account of their wealth, although they were nearly idiots, and from whom this mental defect
defect extended for a century into several families, so that some of all their descendants will continue ideas even in the fourth and fifth generations. Perhaps the resemblances of the mother are rather the most common. The ill-made Per- fians have improved themselves into a very beautiful nation by their repeated marriages with the celebrated Georgian females. The offspring of Negroes and Europeans partakes of the characters of both parents in form, colour, form of the lips, nose, &c.; and we may observe in general, of all such mixed breeds, that the children produced seem to constitute a mean between the father and mother. Peculiarities of formation are not uncommonly transmitted; as a very hollow palate, which I myself have seen, and many others. A man covered universally with hard, elasic, cylindrical, wartv excrescences, begot sons and daughters with the same deformity. An excess in the number of thumbs (four) passed from the father to the children: and there are curious examples of similar facts in individuals poHing five fingers on each hand. Play mentions that Q. Horatius, who had this structure, begot two daughters resembling him in this respect. A family mentioned by Regnemur is more remarkable: the grandfather had a supernumerary finger on each hand, and a toe on each foot. His first son produced three children with the same peculiarity: the second, who had the usual number of fingers, but in whom the thumb was very thick, and货车ed, as if composed of two united together, had three daughters with the supernumerary members: the third had the natural structure. A daughter, with a very thick thumb, brought forth a boy with the additional finger. That too much influence may not be attributed in this case to the influence of the male, it may be observed that another daughter, who had large thumbs, produced some sons with supernumerary members. Maupertius has also recorded a family of children disinguished by this character, produced by a mother with the same peculiarity. The thick lip in the Aulrian family was introduced by the marriage of Mary of Burgundy with Maximilian. It is asserted that caudal mutations, as blindnafs, &c. have been transmitted to the offspring, in horses; and some complain of the plan of employing Arabian stallions rather than mares for improving the breed. There is a peculiar breed of four-horned sheep, depending from the female; and another of pigs with undivided horns. The difficulty of the subject is increased by the circumstance that these defects and peculiarities do not in general pass to the offspring. Blind, lame, or mutilated parents have perfect children. In the family with the supernumerary fingers, already mentioned, several individuals had the ordinary formation. Fowls without the rump breed with the common kind of chicken, both with and without that particular formation; and the same mother has children like herself and the father, and others without such resemblance. 8. Elementa Physiologia, lib. 29, sect. 8.

The phenomena afforded by hybrid generations are curious. It is only in the case of animals very nearly allied in their general characters that any hybrid offspring is produced: and this has the mixed characters of both parents. The relations of women in Africa breeding with monkeys are not sufficiently authenticated. "The mule (produced from the mare by the asf) does not," says Haller, "seem to me to be an asf, which however it resembles in its tail, ears, and obliquity, since the form of the body, the strength and size, the hocks, the hair, and colour are those of the mother. The voice is more like that of the father, and there is a farther resemblance of the asf in the pec ill hair hollow of the larynx. As the mule seems to be stronger and more lively than the asf, so the hairy begotten by the ittalian on the fie-asf, seems rather to follow the mother: it is said to have the ears of the horse, the mane and tail of the asf; and to be smaller than the male. The offspring of the common fie-goat with the Angora he-goat has the long hair of the father; while that of the Angora female with the European male has not that character. The fine hair of the former breed was continued in Sweden to the third generation. This fact shows the prevalence of the male, which, being born in a warmer region, exceeds in stature the European animal. The pheasant breeds with the common hen: the offspring has the mother's colour, with the form of the father, whom on the whole it most resembles. If the animal produced from such a connection breeds again with the male pheasant, the young are complete pheasants. When these and various other analogous facts are compared, we remain in as much doubt as before. It appears that the offspring is affected by both parents, in some cases more by the father, and in others more by the mother. And I think, that where the father is greater in size, his characters prevail, and vice versa." Ibid.

Neither is it merely the form and external appearance that are changed in the cases of hybrid animals; we have already observed that the mule has the peculiar laryngeal cavity of the asf: and it is further known that this animal, and all other hybrids, are very rarely propagated: so that we may conclude that some general internal change is effected in these cases. A more accurate anatomical description of hybrid animals would probably contribute to illustrate the subject: the facts at present in our possession lead us to conclude that the fetus is not produced entirely by the mother or father, that both parents contribute something to the offspring, and that the new being is rather generated de novo than evolved.

In considering the powers by which the admirable structure of the animal frame is raised, we encounter a vast host of the most wild and visionary hypotheses: we descend, to use the expression of Haller, from twilight into regions of utter darkness. In the first place we reject entirely the operation of fortuitous causes: the notions concerning equivocal generation have been sufficiently refuted by modern naturalists, even in the lower orders of animals, where the phenomena, on a superficial view, tend to confirm the vulgar opinions, and there is not even the shadow of probability in favour of such explanations in any of the higher classes.

In these times, however, men of considerable reputation have not been wanting to defend opinions very much resembling the hypothesis of equivocal generation. Buffon has contended that all the parts of an animal are not formed at once, but successively, by epigenesis. His observations concerning the organic molecules of the fenn are believed by some to have been already noticed: he even admits the formation of new beings by putrefaction and by the fortuitous concourse of particles. His associate, Turriever, Needham, does not allow of equivocal generation, but supposes the existence of a power, which forms the body from the smallest germ by the assimilation of aliment. He thinks that the primitive germ alone are created at once, but that there are no compound germs at all resembling animals. He quotes the phenomena observable in vegetable infusions; and conceives that animal and vegetable substances are the same in their origin, and admit of being changed into each other. The first germ of an organized body is very simple, and not yet organized, nor poHing any lineaments of the animal. Hence the smallest animalcula, as consisting of the fewest germs, are formed the foonest; and those of a more compound structure, more slowly. The whole affair of vegetation consists of an expansive force refuting in matter, and a refilling power. The former is perfectly elastic, and exists
in every sensible point of matter; it is affiliated by heat.
There is a power, in every point of vegetable matter, to produce filaments, from which microscopic animula may be formed. A real generating caufe exists in nature. The expansive force is increased, and the resistance diminished, when matter is elevated to a state of vitality. This is effected by the development of the active principles; it returns again to a vegetable nature, when the contrary causes obtain. He does not, however, admit of equivocal generation, but conceives it necessary, that the feminine fluids, both of the male and female, characterized by their peculiar properties, should be present.

In this hypothesis the power of the femen is not neglected, nor is any attraction or fortuitous concourse of atoms admitted. But the experiments on infuscation animulae are employed to authorize conclusions, which cannot be very easily admitted. We find a great difficulty in admitting how any blind force, not regulated by design, can form animals designed for certain purposes, and fit to fill their place in the chain of beings. Hence we find that these animulae are not produced when the experiments are so conducted as to remove all possibility of the introduction of ova from without.
The experiments of Spallanzani clearly prove this point.
The fyllem of epigenesis met with an able defender in C. F. Wolf; see his Theoria Generationum, Halle, 1775, 4to. He explains the mode of growth, and the formation of parts in animals and vegetables, by the action of a power which he calls vir effentia, without any mould or model. This power, together with the fixation or coagulation (foli defectis) of juice, accomplishes the whole work of formation. The heat of the air in plants, and the heart in animals, are accessory causes of generation. The primordia of animals are globules, which cannot be reduced into smaller component parts; neither arteries, veins, nor heart exist in the egg at 2.4 hours. The vis effentias, different from the power of the heart, now begins to act, and, in the globular matter of the area umbilicalis, forms grooves, which gradually growed, and constitute vessels. These at first are large intervals of the globular matter, but gradually become smaller. Membranes are formed round these pellages. All parts are first fluid and inorganic, and then formed into vessels. Trunks are formed to the branches, and at last the great trunk of all, the heart. New parts are formed, from the juices of the first; and thus the organs appear in succussion, one after the other.
Haller refutes this theory from his accurate observations on the formation of the chick; he shews that in fact parts exist, distinguished by their form and other characters, when superficial observation would lead us to infer that there was only an inorganic homogenous matter. The transparency of the whole prevents the outlines and distinction from being visible, but coagulation by acids brings these differences into view. Because the original gelatinous mass, which forms the animal, seems to have no obvious structure or smaller distinguishable component parts, we are not therefore to conclude that it has none. Spirit of wine, poured on this jelly, hardens it so, that we can see fibres, vessels, and viscera, where there seemed at first to be a mere transparent concrete. There is no effential power in the alcohol to model rude matter into an organic structure; but the destruction of the transparency allowed the outlines of parts to be distinguished; similar explanations may be given of all his observations on this subject. Moreover, we can by no means understand how this single power can form such different parts always in the same place in one animal, and according to one archetype, if the materials be inorganic, mutable, and susceptible of any configuration. Why should this matter always produce, without any error, a chicken in the common fowl, a pea-chick in the pea-fowl? Nothing is assumed but a dilating force acting progressively; this might give origin to a vacuolar net-work, growing constantly larger as long as the expansive force exceeded the resistance; but how does it produce a heart, a head, brain, and kidneys? Why is a peculiar order of parts formed in each animal?

Some again have explained the formation of the body according to mechanical principles, by the power of fermentation, &c. We cannot, says Haller, conceive that any power, unless guided by intelligence, can act on matter in a manner constantly changing, and to directed, that inorganic materials are formed into bones, muscles, vessels, and viscera, arranged in a certain order with respect to each other. All spontaneous productions, as for instance the beautiful figures seen in snow, are arranged in an uniform and invariable manner. Let any person, in order to estimate the value of such hypotheses, reflect merely on the eye. How can this organ be moulded by any expansive force into such various succedaneous layers, all differently fabricated, where the light passes through transparent bodies, everywhere surrounded by others perfectly opaque, and so arranged, that in the millions of men and animals the rays of light constantly converge upon the retina? Yet this blind material caule knows nothing of light, nor of the laws by which it is refracted, although we must suppose it to have adapted all the parts so accurately, even to the hundredth part of a line, in order to the collection of the rays in the retina. Again, this unintelligent cause has furnished the eye with eye-lids and eye-brows, and has given to the iris a power of contraction and dilatation, by which the organ is accommodated to too great or too small a quantity of light.

Buffon supposes the nutritive matter to penetrate all parts of the body, and thus formed in them, as in an internal mould; and he conceives that the superfusorous particles are carried back to the femen, conveying into that fluid every thing necessary to the production of a new being, similar to the former. The feminal fluid of either sex contains the particles necessary for forming an individual of the same sex.
These must be mixed for the production of a new being. The generative organs are the baizes of the new animal, and these are first formed of themselves; the other organic particles of the body are arranged round them as a centre, according to the order, which they held in the body, from which they were produced. That sex prevails, of which the particles are the most numerous. The author of this hypothesis considers that it explains completely the resemblance of the offspring to either or both parents, the formation of twins, &c.
The illustrious name of Buffon can hardly induce us to animadvert seriously on such dreams. In the first place, what is an internal mould or model? The authors of the hypotheses are so far from satisfying us on this fundamental point, that they could not be understood; if, unless we had a seventh sense. How then came they to know it? So far from understanding what this model is, we have no hesitation in affenting that its existence is purely ideal. But if we should grant this, there are still insuperable difficulties remaining. Many children are unlike both parents, and they sometimes have parts which both the father and the mother wanted, and with which, therefore, neither parent could have supplied them; this is the case with the offspring of mutilated individuals, and particularly with the male children of fathers who had lost one testis; a case which was not uncommon when castration was an ordinary mode of treating ruptures. The mother cannot bellow on her daughter the hymen, which she has lost; nor can we fee the source from which the foramen ovale, the ductus arteriae, and venous, the
the umbilical vessels, the placenta, the cord, &c. are derived.  

The teeth too must puzzle us greatly. The various transformations, and every other phenomenon in the lower orders of animals, are altogether irreconcilable with the hypothesis.  

The adult frog has no branches, which are yet seen in the tadpoles. In the bee kind, the males, females, and working bees differ in structure. The offspring might resemble the father or mother, but whence do the working bees come, which resemble neither parent, and have no generative organs.  

How entirely does the catapher differ, in all points of its organization, from the butterfly? How can the particular parts unite, when the male and female are so entirely different, as in the case of many insects, where one is winged, and the other not, &c.  

The supposition of the face-to-face fixation of parts round the generative organs is quite indubitable; for those very parts cannot be recognized until a comparatively late period, and after others have been some time formed.  

This fact was confirmed, says Blumenbach, by an observation which I lately made on abortive twins of different sexes, about sixteen weeks old. Although these were remarkable for the beauty of their proportions, and were most perfectly formed according to the standard of their tender age, the difference of the sexual organs could be ascertained only by the most careful investigation; in every other respect, as in the figure, phylogeny, measurement of the limbs, &c. they resembled each other completely.  

P. 387.

In reply to some of these objections it has been affirmed, that those parts of the facts, which the parents have not, are formed by intelligent nature from the fopperity of the organic molecules; that the add a second tesser to the excess furnished by the single gland of the father; and that the placenta and fetal coverings are produced in the same way from the excess of nutritive molecules; but if nature can make wings, intestines, nerves, feet, tails, placenta, and membranes, &c. without any mold, why shouldn't the form the whole body in the same way? and, whence arises this abundance of particles, produced by the tessor of a man, who has only one gland, when the mould must be one half less than in a perfect individual? How came this intelligent nature to be so suddenly produced in a mere machine, when we had before heard nothing of her? Can any one understand how particles transmitted from so vast an extent as the father's whole body, can occupy so small a space, even when united to those of the mother, as to be invisible for several days after conception? In short, there is no female semen, no corpus luteum before copulation, and consequently no fluid from the mother to be mixed with that of the father, and convey to the fetus the female generative organs, the mamma and the other distinctions of the female sex.

A very different theory from that which we have just considered, and a very old one, affirms the formation of the fetus to a formative power of the mind or soul (anima fructrix, vs phylaxis); and some conceive that the object is effected by the mind of the fetus. The partisans of these opinions rely much on the effects said to be produced on the body of the fetus by causes operating on the mother's mind. They allege that the structure of the offspring is often materially changed and impaired by the longing of the mother, or by various violent emotions: that these effects are produced, not from any corporeal cause, but from the action of the mind on the anima fructrix of the fetus; that there is a harmony between the mind of the mother and her body, and between the bodies of the mother and child. Various attempts have been made to explain the manner and nature of this influence and connection. But it would have been better to have established the fact incontrovertibly in the first place. The records of medicine abound with instances of almost all imaginable effects produced on the fetus from the causes above-mentioned: —of the likeness of fruits or flowers, &c. on the body, of various animals, of bruises; —of parts being cut, destroyed, or otherwise injured, &c. &c. That credulity and ignorance have given birth to most of these narratives, cannot be doubted. Our faith in them must be most seriously shaken when we observe that there are no examples of the most violent mental disturbances, as terror, longing, passion, occurring repeatedly during pregnancy, particularly in delicate and hysterical women, without any thing unnatural appearing afterwards in the child, even when the mother has expressed her strong persuasion that her child would be mutilated. Nor can women forestell when the marks above alluded to (navi) will appear. Deformed and monstrous children, and others marked with navi, have been repeatedly observed by the most judicious and accurate observers, when the mother was not conscious of any such cause as those above alluded to. Children are born blind of healthy parents without the occurrence being considered as extraordinary or requiring any thing accidental to account for it. When women observe any deformity in their offspring, they recall to their memory every thing which has happened during their pregnancy; and if they can remember any fall or fright, or suddenly seeing any uncommon animal, the carcase of a bird opened, or a wound, &c. they immediately set it down as the cause of the phenomenon. And, from the various turns which superstitious and whimsical fancies take in different countries, the same appearances are ascribed to very different causes.

In weighing the testimonies of authors, we shall find that the most experienced and judicious indulge the common notions about navi much less than others. In the numerous collections, where monsters and extraordinary productions of all kinds are carefully collected and preferred, we see no example of a genuine navi, according to the common notions, that is, of the resemblance of a fausage, or a pig's foot, or a wound, &c. in any part of the body of a fetus. In further support of our opinions we may quote the numerous instances of monsters, vegetable productions, which cannot be ascribed to any power of imagination, or any mental affection whatever. We cannot doubt that the egg and the ovum contain the cause of the future structure, which is always preferred uniform in the same species. That various external circumstances, as a copious or deficient supply of nutrition, and many causes of a nature entirely unknown to us, may have an effect in altering or variously modifying the original fabric, within certain limits, we do not pretend to deny.

If the phenomenon of navi afford no proof of a plastic soul; if we acknowledge that the beautiful structure of an animal body cannot be reared by chance, nor by any blind force with which inorganic parts may attract each other, it remains for us to consider whether the fetus is formed before the time of conception, according to the hypothesis of evolution. This opinion has been chiefly held in modern times: it is ably defended by Haller, and has been supported by the experiments and writings of Spallanzani and Bonnet.

If, says Haller, the germ or original of the fetus be contained in the mother, if it be already formed in the ovum, and so far perfected as to require merely a supply of nourishment for its growth, the great difficulty of forming such an artificial and complicated structure from inorganic matter is overcome. In this hypothesis, the Creator,
with whom nothing is difficult, forms the machine: he has arranged dead matter, in conformity with his own designs, and according to the archetypa fixed by his wisdom, before the accession of the influence furnished by the male. In the same way you may have in plants a perfect flower, capsule, and well-formed seeds, differing from fruitful seeds only in the circumstance, that they would not grow into a new plant. The metamorphoses of insects have been adduced in support of this notion of evolution: the butterfly, so entirely different from the chrysalis, was entirely contained in the former, and needed only to be disengaged by the removal of the skin, and have its parts unfolded. The rudiments of the race, which are to contain air in the bee, exist in the fatty substance of the worm from which the perfect insect is formed, and numerous examples of a similar description might be adduced. The phenomenon of incubation, and the successive appearance of various parts until the whole animal is completed, afford a convincing argument for the hypothesis of evolution. After recounting the gradual and progressive unfolding of the body of the chicken, Haller observes, that the progress is nearly the same in quadrupeds. "In the human fetus, which at first seems a mere unorganized mass, Leeuwenhoek already discerned, by means of his microscopes, distinct organization. Thus it is clear, that an animal without any limbs, or discernible arrangement of parts, is gradually changed by various stages into a perfect being, nourished by food, and susceptible of voluntary motion. It may be inquired, whether the animalcules, before it can be recognized by the senses of the director, exist in the father or the mother; whether they were formed by epigenesis, or the successive union of particles: or whether we may call them组织. Epigenesis is altogether possible. Whoever has contemplated the structure of the body with a little attention, must be convinced that an animal could not exist without a heart, since the principle of life and motion exists in that organ. But the heart must be furnished with arteries to carry the vital fluid to all parts, and with veins to carry it back again.

It is easily proved that the fetus does not consist of a mere skeleton of blood-vessels. Viscera must accompany these, of which, with some cellular substance, they are entirely composed. But no one has seen the viscera composed by particles successively deposited: they are perfect, although small, as soon as they can be discerned. Mucules must have been present from the first: for the young animal, in the incubated egg, is capable of motion, and from its slightest state bends the body. It is moreover irritable, and must consequently have mucules, although they are concealed under the appearance of a mere gelatine. The head is large, and the eyes are visible among the first parts, together with the heart. The mucules require the presence of nerves, the brain must have been present with the head and heart." The hypothesis then, to which these arguments lead, is, that the perfect animal exists previously to conception, and that nothing new is generated, but that the parts, which were folded up, and contracted into a small space, are expanded, unfolded, enlarged, and rendered conspicuous. In this mode of explanation, we must, it seems, admit, that the germ of all the human race, as well those who have already lived, as those who may hereafter be born, were contained in the ovum of Eve: a proposition of so strange a nature, and so completely unanswerable, that we cannot value very highly the hypothesis, which renders it necessary.

The pre-organized germ would remain in a kind of torpid state in its ovum receptacle, were it not stimulated by the male semen. This fluid arouses it from its lethargy, and causes its growth and development. The stimulating properties of the semen are supposed by Haller to excite the motion of the heart; and he conceives that the subsequent development of the new being is easily understood.

The great reputation of Haller has not however gained his opinions on this subject universal assent. The accurate and well-informed Blumenbach of Gottingen has opposed the hypothesis of evolution with great effect, and has arrayed against it a number of objections, which its advocates will not easily elude. His opinion on this subject are, on the whole, the most rational that have hitherto promulgated: the following statement of them is derived from his manual of natural history, and his institutes of physiology. "The hypothesis of evolution has been employed, particularly in modern times, in order to explain the origin of organized bodies; it has been stated that no man, no other animal, and no plant is generated, but that they have all existed in their parent and ancestors, in the state of complete previously formed germ, since the first creation. The various generations have been continued, one within the other, like a series of pill-boxes, and have been only gradually unfolded and brought to light by fecundation, in their respective turns." Haller, who was the leader of the modern evolutionists, roundly asserted, "that the viscera, and all the bones of the future fetus, exist before conception in the maternal germ, but nearly in a fluid state, and therefore invisible." This opinion must be formed, on the first view of it, irreconcilable with reason, on account of the complication involved in it, of the utmost creation of innumerable germs, which are never to be evoked, and it is utterly at variance with all clade and found phyiological reasoning, on account of the great aid which it requires from preternatural agency, and the hopeless complication of natural powers which it supposes in opposition to all the laws of philosophical investigation. According to the unanimous representations of the most celebrated and zealous advocates of evolution, the pre-organized germs lie ready in the mother, are routed at the time of fecundation, and proceed to their development by this agency of the male seminal fluid. What we call conception is, therefore, nothing but the excitation of the torpid germ by the affusion of the male liquor. Here then, in the first place, we must suppose an exciting power. But children often resemble most strikingly their father only: hitches, after copulating with different dogs, often have puppies resembling their different fathers: two individuals of different races, as a Negro and an European, produce together offspring of a middle character, or a mulatto: and, where the species of animals or plants is different, mongrels are produced, having as many characters of the father's formation as of the mother's. All these facts cannot be overlooked; and, in order to account for them, the evolutionists suppose in the fermen, in addition to its exciting influence, a formative power, by which it can change the pre-organized germ contained in the mother into something of the form of the father. Thus we find two powers in the fermen, an exciting, and a formative one. But, by means of an artificial hybrid intermixture, repeated through several generations, we can, at last, change one species of organized bodies entirely into another. One species of plant, fecundated with the male pupule of another, produced seeds, from which hybrid fecundable plants were produced. These were again fecundated with seeds of the same male plant; and, after this had been repeated four times, a complete metamorphosis had taken place, by which the characters of the male were fully
fluted for those of the female plant. The same circumstances will occur in the human species if the offspring of an European woman by a negro be fecundated by a negro; and the produce of that conception again by a negro, &c. Thus, at last, the preformation of the maternal germ, which has been preferred since the creation of the world, avails nothing, but yields entirely to the formative power of the male fluid, which, according to the hypothesis of evolution, should merely excite it to action. We may affirm, in short, on the whole, that of all the phenomena adduced in support of this hypothesis, not one can be established sufficiently clear to be admitted as a proof; while there are numerous unexceptionable observations directly opposing it.

But, in proportion as this hypothesis of evolution is inconsistent with the phenomena, and with the rules of philosophy, so, on the contrary, the opinion, not that any fictitious germs are evolved by means of conception, but that the new being is in fact generated, and gradually and successively formed from the generative fluids, commends itself to our approbation by its simplicity, and its accordance with the other processes of nature.

Since this affair of a true generation by successive formation has been variously explained by physiologists, I conceive that we shall approach most nearly to the truth, by adopting the following propositions. 1d. The materials, of which organized bodies, and consequently the human frame is composed, differ from all other matter in being regulated simply and exclusively by vital powers. 2d. Of these the most remarkable, and that, whose existence and agency can be the least questioned, is the force which acts on organized matter, when prepared for its destination, but not yet moulded into shape, and betows on it, according to its various natures, various but determined and definite forms. In order to distinguish this vital power properly from all others, I give it the name of nius formativus. 3d. This nius formativus is imparted to the materials of generation, when they are contained in a mature flate, under the requisite conditions, in the urine cavity, builds up in it the rudiments of the embryo, and gradually forms its organs to correspond to their pre-ordained purposes; it preserves the same structure by the process of nutrition, as long as life continues; and it obviates the effects of casual mutation, as far as that can be accomplished, by means of reproduction.

This gradual formation of new organized bodies can be most manifestly discerned in thoé, which combine, with a considerable magnitude, a rapid growth, and such a kind of delicate semi-transparent texture, that they can be clearly seen through, particularly in a sufficient light, and with moderate magnifying powers. This is the cafe in the vegetable kingdom, with some simple aquatic productions, as the coniferae, in the marine class, which is propagated in the early part of spring; in the bloodless divisions of the animal kingdom, with the polypoys (lydra); in the animal kingdom, with the incubated egg, on the first appearance of the chicken, and its subsequent daily development.

It must be observed here, that the expression nius formativus is employed simply for the purpose of distinguishing this from the other kinds of vital powers, and by none means with any intention of explaining the cause of generation. I believe the latter to be concealed by no lefs impenetrable darkness than that which involves the causes of gravitation and attraction, which are only names for effects, recognized like the nius formativus, a posteriori. I have employed the word nius chiefly in order to denote that the nature of this force is truly vital, and to distinguish it as clearly as possible from the merely mechanical powers, by means of which

some philosophers formerly endeavoured to explain the business of generation. The very point on which the whole of this doctrine concerning the nius formativus hinges, and which alone sufficiently distinguishes it from the vis vitalis of the ancients, the vis essentiales of Wolf, and other hypotheses of the like nature, consists in the combination of the two principles, by which the nature of organized bodies is explained, viz. the phisico-mechanical and the teleological.

I hold it most probable, that in the first place, a definite time is required for the various fluids of each sex, which seem to be united in the cavity of the uterus after a fruitful copulation, to be more intimately mingled, and brought to maturity. When the period of this preparation is completed, the mature and intimately blended fluids become animated by the nius formativus, by which the hitherto unformed materials of generation are partly moulded into the elegant coverings of the ovum, partly into the figure of the contained embryo. Hence we can understand, why the smallest vestige of a formed fetus cannot be discerned, even with the aid of the excellent modern optical instruments, during the first week after conception, excepting the unformed fluids contained in the uterine cavity; while the embryo appears as it were on a sudden in the third week.

I should exceed the limits of these institutions, if I were to pursue at greater length those arguments drawn from nature herself, by which the influence of the nius formativus in generation seems to me to be rendered very highly probable. I shall advert very shortly to a few of these points, the force of which will be easily discovered by a more attentive consideration. On this principle I explain the memorable experiment in the history of hybrid productions, where prolific hybrids, fecundated during several generations, by the male seed of the same species, have produced an offspring gradually deviating from the original maternal form, and assuming the characters of the father, until at last the former has been completely changed into the latter by a kind of arbitrary metamorphosis.

The well-known fact of the great frequency of monstrous productions in some species of domesticated animals, particularly fowls, and their rarity in the wild condition of the same animals, can only be explained on the principles already stated. The evolutionists are compelled to assert that all these monstrosities must have existed in the germ from the first creation of things. The phenomena of reproduction, taken altogether, can be much more aptly explained by the agency of the nius formativus, than on the action of pre-existent germs; and some particular examples, as, for instance, of nails growing in the middle, after the loss of the first phalanx, cannot well be solved on any other principle.

After considering, and carefully weighing the arguments on both sides of the question, it appears, that even those who assume pre-existent germs, must allow to the male seminal fluid a considerable formative influence, in addition to the exciting power, which they recognize in it, and consequently that the doctrine which they defend requires, in fact, the assistance of the nius formativus; while the latter sufficiently explains the phenomena of generation, without the aid of pre-existing germs." Whatever theory of generation we adopt, w: must ultimately ascend to the agency of the Creator, the primary cause of all existence.

The circumstances belonging to the state of pregnancy; the period and phenomena of parturition and its consequences, are treated under those articles of the Cyclopedia which relate to the subject of midwifery.
GENERAL


Generation of Plants. See Foundation and Gemma.

Generation of Shells. See Shells.

Generation of Stones. See Stones, Spar, Trochites, and Crystals.

Generation, in Theology. The father is said, by some divines, to have produced his Word, or Son, from all eternity, by way of generation; on which occasion the word generation raised a peculiar idea: that procession which is really effected in the way of understanding, is called generation, because in virtue thereof the Word becomes like to him from whom he takes his original; or, as St. Paul expresses it, the figure or image of his substance, i.e. of his being and nature. See Trinity and Person. And hence it is, they say, that the second person in the Trinity is called the Son.

Generation is also used, though somewhat improperly, for genealogy, or the series of children inferred from the same stock. Thus the gospel of St. Matthew commences with “the book of the generation of Jesus Christ, &c.” The latter and more accurate translators, instead of generation, use the word genealogy.

Generation is also used to signify a people, race, or nation, in the literal translations of the scripture, where the word generally occurs wherever the Latin has generation, and the Greek γενεαί, γενεᾶς.

Thus, “A wicked and perverse generation seeketh a sign,” &c. “One generation passes away, and another cometh,” &c.

Generation is also used in the sense of an age, or the ordinary period of a man’s life.

Thus we say to the third and fourth generation. In this sense, historians usually reckon a generation the space of thirty-three years, or thereabouts. See Age.

Herodotus makes three generations in an hundred years; which computation appears, from the latter authors of political arithmetic, to be pretty just. See Chronology and Political Arithmetic.

GENERATOR, in Music, signifies the principal found or bounds by which others are produced. (See GENERATE.) Thus, the lowest C for the treble of the harpichord, besides its octave, will strike an attentive ear with its twelfth above or G in alt, and with its seventeenth above, or E in alt. The C, therefore, is called their “generator,” and the G and E its products or harmonics. But in the approximation of chords for G its octave below is substantiated, which constitutes a fifth from the generator, or lowest C; and for E is likewise substantiated its fifteenth below, which, with the above-mentioned C, forms a third major. To the lowest notes, therefore, the denominations of products or harmonics are likewise given, whilst the C retains the name of their “generator.” But still, according to the system of Tartini, two notes in concord, which, when produced, produce a third, may be termed the “concurring generators” of that third.

GENERAL NAME, in Natural History, the word used to signify all the species of natural bodies, which agree in certain essential and peculiar characters, and therefore all of the same family or kind; so that the word used as the general name equally expresses every one of them, and some other words expressive of the peculiar qualities or figures of each are added, in order to denote them singly, and make up what is called a specific name.

Thus the word rosa, or rose, is the general name of the whole series of flowers of that kind, which are distinguished by the specific names of the red rose, the white rose, the apple rose, &c. The ignorance of former ages, in the true principles of natural history, has occasioned the bodies, which are the objects of it, to be arranged into very unnatural series under the name of genera; and these have been called by names as improper as the characters they were distinguished by. Linnaeus has done a great deal in exploring the bad general names in botany, and Artedi has applied his rules about the formation of these names with very little difference to the subjects of ichthyology.

Many of the general names of fish, till the time of this author, were so barbarous and obscure, that it was not easy to trace them to their original, or to find whether they were truly Teutonic, English, Dutch, Swedish, French, Italian, Spanish, Portuguese, Latin, or Indian. The ignorance of the writers on these subjects, or their too frequent adherence to the customs of their predecessors, seem to have been principally the causes of this, and often an entire regurgitation. Artedi’s rules for general names for fish are these: whatever fish there are which agree in the same general characters, and are properly of the same genus, these ought all to be called by the same general name, their differences being only expressed by specific ones. This appears to plain, to just, and to necessary a rule, that it is also most a shame to lay it down; yet the writers on fish, till the time of this author, had very seldom observed it.

Another barbarism and impropriety in the general names of fish among the old authors, is the using of the same words to express them, which are also the names of other animals, quadrupeds, birds, and reptiles. These are subject to great objection; because when they are used, it is not easy to see, in some cases, whether the author is speaking of a bird, a beast, or a fish. It is therefore one of the general rules of Artedi, that all these names are to be abolished, as also all those which are common to fish, and to plants, minerals, and to the tools of husbandry, or other services.

Another rule of this excellent author is, that general names that are composed of two whole words, unnaturally tied together, are to be abolished, it being easy to contrive names that are barbarous, and as expressive: next to these are to be exploded those names which are formed of several words before in use, the one broken or cut short, the other preferred entire.

Another general rule in regard to these names is, that all such as are not of either Latin or Greek origin, are to be proscribed and wholly rejected. This rule cuts off a prodigious number of barbarous words, with which we find the books of authors of former ages on these subjects crowded.

A sixth rule for the regulating general names is, that all such are to be abolished as terminate in adus, as expressing a resemblance often imaginary, and often alluding to something unknown, or rendered difficult to trace from the changes which the names of other things have undergone since the time it was formed. These words convey no idea of the character of the genus expressed by them, except that they are like the other thing alluded to in some external, though perhaps not essential, character; of this kind are the rhomboids, lepidopods, &c.

A seventh rule in regard to these names is, that all such are to be rejected as are barely diminutives, and terminate in als or uth. These convey no other idea, but that of the fish being like some other fish, only less: now bignefs is no general character; therefore if this genus, and that referred
ferred to, differ only in five, they have no generical difference at all: if they do differ otherwise, they should be exprest. What makes many of these names also more inadmissible is, that they allude not to fish, but to other things so different in their nature, that there must needs be many other more essential varieties between them, besides fish.

Another general rule is, that such generical names as are pure Latin, but are mere adjectives, are to be exploded: there being no reason for using them as substantives.

A ninth general rule is, that such names as are formed of Latin words, unknown to the ancient Romans, and forced by the later writers, are to be exprest as barbarous, and others of better credit placed in their stead.

Finally, such generical names as have been given to fish from the places where they are caught, are to be rejected: of this kind are the tarda and tarnica from the land of Sardina, and the floria from Artilis, a province of Spain. These forms of names can convey no idea of the nature of the fish, and may belong as well to one genus as to another.

Artedi, Ichthyolog. p. 10. 69. 73. 79.

These rules of prostration handled so many of the received generical names of fish, that it might be supposed the whole number was exhausted, and all the fish in the world to be named anew. But this is not the case: the genera are, in reality much fewer in number than they have been usually supposed, and therefore fewer words will serve to express them, and there yet remain many truly Latin words used by the ancient Romans, by which the far greater part of the genera may be exprest, and the few remaining may be best denominated by compound Greek words, expressive of their real characters.

Among the true and genuine Latin, and Greco-Latin names of the genera of fish, there are: acipenser, anis, anisus, halecena, blemius, clupeus, eobates, cyprinus, delphinus, clupea, coccus, clupeus, gobius, labeus, lamia, liparis, mugil, mullos, marina, percus, phylather, pristis, rajus, salmo, salpa, saurus, sauber, talus, iphas, xelopus, xiphias, zeus. These will go a great way toward the naming of the true genera.

Artedi has enriched greatly of the world, in this reforming the names of fishes and the rules he has laid down, thus given at large, may, with little variation, be made to serve for any other author, in whatever branch of knowledge he has occasion to write.

GENEROSIS SECOND. See SECOND.

GENEROSA, a Gentlewoman. See GENTLEWOMAN and SPINSTER.

GENEROSITY, Order of, an order of knighthood, established in 1649, by Frederick Ill., elector of Brandenburg and king of Prussia, whilst he was electoral prince. The badge was a gold cross of eight points enamelled azure, bearing in the centre this inscription "La Generosit" and under to a blue ribbon.

GEOGRAPHIA, a town in the Arabian Iraq; 90 miles S. of Bagdad.

GENSAB, or GENSABER, called also Gensabo, and afterwards Jibrut, a town of Isbline on the lake of the same name, called also seer of Gilead, which see.

GENESEE, a township of America, in the state of New York, and county of Ontario, having 211 electors.

GENESEE Country, a large tract of land in the state of New York, deriving its name from Genevise, one of its rivers, and bounded N. and S. by lake Ontario, S. by Pennsylvanias, E. by the western part of the military townships in Vermont county, and W. by lake Erie and Niagara river. This is a rich tract of country, and well watered by lakes and rivers, it is flatish, its rivers are sluggish, the soil is moist, and its lakes are numerous.

GENESEVER, or Geneve River, rises in Pennsylvania, near the most elevated spot of this state, where also the cañon of the Allegheny river, and Pine creek, a water of Susquehanna, and Tioga river rise. It has several falls, which furnish excellent mills, etc., that are improved by the inhabitants. After a course of about 100 miles, chiefly N., it discharges itself into lake Ontario, 43 miles E. of Greatwater, or Edmunds bay, and 2 miles E. from the fall of Niagara. The settlements on this river, from its mouth upwards, are: Northfield, Northampton, Hartford, Genevee, and Williamshurgh. When the western canals and locks are completed, there will be a traveling place between the city of New York and Williamshurgh. The Geneve River lies on the borders of this river, about 20 miles in length and about four in breadth. These are mostly the property of the Indians.

GENEVER, or Geneve County, is bounded N. by lake Ontario, W. by Niagara river and lake Erie, S. by Pennsylvania, and E. by the counties of Tioga and Orandago. It comprehends the counties of Ontario, Steuben, and Genevee, and contained, in the year 1828, upwards of 17,000 persons. This county is finely watered by the Geneve River and its tributary streams, several creeks, and also lakes, which are from 20 to 40 miles in length. The southern part is watered by several branches of the Susquehanna. This country is large, and comprehends the western part of the state of New York.

GENESIS, in Biblical History, the first book of the Old Testament, containing the history of the creation, and the lives of the first patriarchs.

The book of Genesis stands at the head of the Pentateuch, which see. Its author is held to be Moses; it contains the revelation of 2360 years, viz., from the beginning of the world to the death of Joseph. The Jews are forbid to read the beginning of Genesis, and the beginning of Ezekiel, before thirty years of age.

The Hebrews called this book B. yei forbidden, because it begins with that word, which in their language signifies in principle, or in the beginning. The Greeks gave it the name Genesis, from g. o., production, generation, because it begins with the history of the production or generation of all beings.

This book, besides the history of the creation, contains an account of the original innocence and fall of man; the propagation of mankind; the rise of religion; the general defection and corruption of the world; the deluge; the restoration of the world; the division and peopling of the earth; and the history of the first patriarchs to the death of Joseph. It was easy for Moses to be satisfied of the truth of what he delivereth in this book, because it came down to him through a few hands: for from Adam to Noah, there was one man, viz., Methuselah, who lived so long as to see them both; in like manner Shem conversed with Noah and Abraham; Isaac with Abraham and Joseph, from whom the records of this book might easily be conveyed to Moses by Amram, who was contemporary with Joseph.—Patrick.

GENESIS, in Geology, denotes the formation of a line, plane, or solid, by the motion or flux of a point, line, or surface. See each respectively; also Elevation and Curve, and Generation.

The geoin, or formation, e. g., of a globe or sphere, is conceived by supposing a semi-circle to revolve upon a right line, drawn from one extremity thereof to the other, called its axis, or axis of circumvolution: the motion or revolution
of that semi-circle is the genesis of the sphere, &c. See \underline{Globe} and \underline{Sphere}.

In the genesis of figures, &c. the line or surface that moves, is called the deferent; and the line round which, or according to which, the revolution or motion is made, the dirigent.

\textbf{GENEST, Charles-Claude}, in \textit{Biography}, was born at Paris in 1630. Being of an unpretented disposition, he resolved to go to the Indies to seek his fortune, but the vessel in which he sailed having been captured by the English, he was brought to London, where he subsisted for some time by teaching the French language. On his return to his own country, he obtained the post of preceptor to Madame de Blois, afterwards duchess of Orleans, and other considerable offices among the great. He became a member of the French academy in 1698, and died at Paris in 1739. Though a courtier, he was sincere and simple in his manners, and estimable in his character. He derived a taste for natural philosophy from the lectures of Rohault, the disciple of Descartes, and for metaphysics from the instructions and conversation of Buffet. He was an elegant scholar, and greatly devoted to poetry and polite literature. His works are numerous, of which the principal are \textquoteright{Principes de Philosophie,} in which the author adduces many arguments in defence of a God, and of the immortality of the soul. \"Occasional Pieces of Poetry.\" Several tragedies, and \"A dissertation upon Passoral.\" Mercier.

\textbf{GENEST-DAMBRIERRE, St. in Geography, a town of France, in the department of the Vienne; seven miles W. of Châtellerault.}

\textbf{GENEST-MALLISAUT, St. a town of France, in the department of the Loire, and chief place of a canton in the district of St. Etienne; four miles S. of St. Etienne. The place contains 1587, and the canton 5648 inhabitants, on a territory of 150 kilometres, in five communes.}

\textbf{GENET, Francis, in Biography, was born at Avignon in the year 1640; here he received his grammatical learning, and having acquired a considerable knowledge in the Latin and Greek, he entered upon philosophy, and was for a time a disciple of Scottus, but he afterwards relinquished his studies, and became zealously attached to the philosophy and theology of Aquinas. In 1670, he was admitted to the degree of doctor in civil and canon law at Avignon, and acquired much reputation by the theses, which he delivered on that occasion, against infancy. His talents recommended him to the notice of the archbishop of Aix, who for some time made use of him in the management of the ecclesiastical concerns of his metropolitan district. He was afterwards employed and patronized by M. Le Camus, bishop of Grenoble, who engaged him in the composition of a syllabary of moral theology, which was afterwards published in five volumes 1720, under the title of \"Moral de Grenoble.\" This work was well received, has gone through many editions, and has been translated into the Latin language. Soon after its publication, the pope, Innocent XI. created M. Genet canon and prebend of the cathedral church at Avignon, and in 1685 appointed him bishop of Vaison. He discharged all the duties of his episcopal functions with exemplary watchfulness and zeal, till the year 1688, when he was prosecuted for having admitted into his diocese the religious belonging to a new convent at Touloanche, which Louis XIV. had suppressed. By the arbitrary mandate of the king, the good bishop was arrested, and imprisoned for fifteen months in the isle of Rhe, whence he was released by the intervention of the pope. He was accidentally drowned in 1702. Moreiri.

\textbf{GENET, or Jennis, said to be derived from \textit{verpes}, some notus, in the \textit{Manege}, &c. a small-sized, well-proportioned Spanish horse.}

Some also give the name geneta to well-made Italian horses.

\textbf{GENET, Order of, an order of knighthood, instituted in France by Charles Martel in the year 726, for commemorating a signal victory, which he obtained in that year over the Arabian army, commanded by Abdarrah. The badge of the order was a genet sable, enamelled azure, spotted or flecked gules, and collared or, on a mount vert, enamelled with flowers proper. This badge was worn pendant to a collar composed of three chains of gold interlaced with red enamelled rosettes. This order was instituted for sixteen knights, and continued in great repute till the reign of king Robert, when it was abolished on his deviation the order of the star, in honour of the holy virgin.}

\textbf{GENETHLIA. \textit{Teuthis}, in Antiquity, a solemnity kept in memory of some person deceased.}

\textbf{GENETHLIAE, in Biology, formed of the Greek \textit{genethlai}, signifying generation, \textit{natal}, nativity, in \textit{Veterinary}, persons who erect horsecap, or pretend to forestall what shall befall a man, by means of the stars which preceded at his nativity.

The ancients called them \textit{Chaldai}, and by the general name \textit{magi}, according to the several civil and cabinet laws, which we find made against the mathematicians, only respect the genethlai, or astrologers.

They were expelled Rome by a formal decree of the senate; and yet found so much protection from the credibility of the people, that they remained therein unmolested. Hence an ancient author speaks of them as \"homine genus, quod in civitate nostrae temper & vetabitur, \& retribui.\"}

\textbf{Antipater and Archiæpolis have shown, that genethiology should rather be founded on the time of the conception than on that of the birth. Vitruvius.}

\textbf{GENETHLIAECUM, GENETHLLACUM, Poem, is a composition in verse, on the birth of some prince, or other illustrious person; wherein the poet promises him great honours, advantages, success, victories, &c. by a kind of prophecy or prediction: such is the eulogy of Virgil to Bollo, beginning,}

\textbf{\"Sicelides Mufa, paulo majora canamus."}

There are also genethlial speeches or orations, made to celebrate a person's birth-day.

\textbf{GENETIDES, in Natural History, a name given by the ancients to the stone more generally known under the name enammonites. This was the first inculcated on the tops and sides of subterranean caverns, which they supposed daily to bring forth more, and therefore gave the power of it to women at the time of their lying-in, to promote their speedy delivery.}

\textbf{GENETTA. \textit{To ride a}, is to ride in the Spanish fashion, \&c. with the stirrups so short, that the spurs bear upon the flanks of the horse. This is deemed a piece of gallantry in Spain, but not among us.}

\textbf{GENETTA, in Zoology, a species of \textit{Viteria}, which see.}

\textbf{GENETTE, in the \textit{Manege}, a Turkish bit, the curb of which is all of one piece, and made like a large ring, and placed above the liberty of the tongue. When they bridle a horse, they make his chin pass through this curb, which surrounds his head. This sort of bit was much used at the court of France when Guillet wrote.}

\textbf{GENETYLLIS, \textit{Februalis}, in Antiquity, a solemnity celebrated by women, in honour of Genetyllis, the goddess of that sex.}

\textbf{GENEVA, or \textit{Gin}, a popular name for a compound water,}
GENEVA.

water, which is, or ought to be, procured from the berries of the juniper-tree, distilled with brandy or malt-spirits. See JUNIPER.

The word is formed from *genevre*, the French name of the juniper-berry.

The best geneva we now have, is made from an ordinary spirit, distilled a second time with an addition of some juniper berries; but the original liquor of this kind was prepared in a very different manner. It was a custom in the distilling of spirits from wort, or other fermented liquors, to add in the working some aromatic ingredient, such as ginger, cortex Winteranum, or grains of paradise, to take off the bad flavour, and to give a pungent taste to the spirit. Among other things used with this intent, some tried the juniper-berries, and finding that they gave not only an agreeable flavour, but a very valuable virtues also to the spirit, they brought it to a general custom, and the liquor fold under the name. The method of adding the berries was in the malt in the grinding; a proper proportion was allowed, and the whole was reduced to meal together, and worked in the common way. The spirit thus obtained was flavoured *abo exigas* with the berries, and exceeded all that could be made by any other method. Our common distillers leave out the juniper-berries entirely from the liquor they now make and sell under that name. Our chemists have let them into the secret, that the oil of juniper-berries, and that of turpentine, are very much alike in flavour, though not in price; and the common method of making what is called geneva in London, is with common malt spirit, and a proper quantity of oil of turpentine distilled together. Shaw's Essay on Distill. p. 7. See DISTILLER.

GENEVA, in Geog., a city of France (since the revolution), principal place of a district, and capital of the department Levan, but formerly capital of a republic, in alliance with the Swiss; situated on the confines of Savoy, France, and Switzerland, at the southern extremity of the Lake of Geneva, 6. of Leman lake, upon the narrowest part of it; where the Rhone divides in two large and rapid streams, which join afterwards unite, and, passing through the city, divides it into two unequal parts. The adjacent country is uncommonly picturesque, and abounds in magnificent views, formed by the town, the lake, the numerous hills and mountains, particularly the Salève and the Môle, rising suddenly from the plain in a variety of fantastic forms, backed by the glaciers of Savoy, with their frozen tops glittering in the sun, and the majestic Mont Blanc rearing its head far above the rest. Geneva, which stands partly in the plain, upon the borders of the lake, and partly upon a gently ascent, is irregularly built: the houses are high, and many in the trading part of the city have arcades of wood, which are raised even to the upper storeys. These arcades, supported by pillars, give a gloomy appearance to the street, but are useful to the inhabitants in protecting them from the sun and rain. This is the most populous town in Switzerland; and the inhabitants are estimated to be from 23,000 to 25,000. This population is owing to the industry and activity that prevail in this place, to its extensive commerce, to the facility of purchasing the burghership, and to the privileges which the government allows to all foreigners. The members of this city are distinguished into citizens and burgesses, inhabitants of native birth, and foreigners, who are divided into five classes, established after the revolution in 1782, and called "dominics," who receive from the magistrates an annual permission to reside in the city. The citizens and burgesses were, under the old police, admitted to a share in the government; the inhabitants are strangers allowed to settle in the town with certain privileges, and the natives are the sons of these inha-

The liberal policy of this government, in receiving strangers, and conferring the burghership, is the more remarkable, as it is contrary to the spirit and usage of the Swiss. Here it is peculiarly necessary; as the territory of this state is so very small, that its very existence depends upon the number and industry of the people; for, exclusively of the city, there are scarcely 16,000 persons in the whole district of the Genevois.

Geneva boasts, and not without reason, of its antiquity. The precise time of its commencement is not known; but it existed before the Christian era, and is particularly mentioned by Caesar. (De Bell. Gall. l. i. c. 1.) It belonged to the Allobroges (see this article), and flourished under the successors of Caesar. The Christian religion was introduced among the Genevans in the third century, and about the middle of the 4th century Geneva appears to have been the seat of a bishop. It suffered, however, in a considerable degree, and in common with other parts of the western empire, from the incursions and ravages of the northern barbarians. About the middle of the fifth century the Vandals, who had settled in the country of Vaud, and built several strongholds, assumed the name of Burgundians, or, according to modern orthography, Burgundians, had possession of it; and in the year 520, it was transferred to the Franks. Towards the end of the 8th century, Charlemagne convened an assembly of his vassals at Geneva, to consult about a war with the Lombards, and confirmed both the civil and religious privileges of this city. In the year 1032, it was annexed to the German empire; but the authority of the emperor was little regarded in distant provinces, and they found it expedient to protect associations of the common people, and to enlarge their liberty, in order to counteract the tyranny of the lords and clergy. In process of time, the clergy acquired a great degree of secular power and jurisdiction in connection with their spiritual authority: and thus the bishops of Geneva had obtained of the emperor the title of princes and sovereigns over the town and the adjacent country. On the other hand, the counts of the Genevois, or of the district in the vicinity of Geneva, who were originally officers of the empire, though afterwards they became vassals of the bishops, aspired to an exclusive administration of justice both in the town and the country. The people availed themselves of the contest between their superiors in rank and power to confirm and extend their own privileges. In the mean time, the liberty of the city was menaced by a third power, no less formidable than either of the other two. The counts of Savoy became powerful by the successive possession of feudal provinces; and among the rest the Genevois favoured the pretensions of the ancient counts, and aspired to the sovereignty of a flourishing town, which was also a convenient and strong frontier.

It would not be very interesting to relate, in minute details, the contests that were from time to time renewed between the Genevese and the counts of Savoy. We shall content ourselves with observing that in the year 1415, the emperor Sigismund visited Geneva, and that two years afterwards he erected Savoy into a dukedom in favour of Amadeus, the 8th count, who, in the year 1420, petitioned the pope for the sovereignty of the city. The duke's suit was referred by the pope to the bishop, who summoned a general assembly of the people, to deliberate upon the duke's request, which had obtained the approbation of the pope. The inhabitants unanimously rejected it, and at the same time required the bishop to be true to his charge, affurming him of their con-

G. 4.

A. 5.
currence in maintaining his just rights, and those of the city. This noble spirit encouraged the bishop, and produced a most excellent act in favour of liberty: for he entered into a formal agreement with the people and the syndics, never to alter the constitution without their consent. This act, having been engrossed in Latin, and the observance of it sworn to by the bishop, the syndics, and the council, was subscribed by all the magistrates, commonalty, and clergy of Geneva; and in the following year was confirmed by the emperor Sigismund, who declared Geneva to be an imperial city, under the title of “Nobile Imperii Membrum,” and took it into his immediate protection against all powers, the duke of Savoy in particular. The Genevese, however, maintained their liberties against the repeated attacks made upon them by the dukes of Savoy under very great disadvantages. Nevertheless, they persevered till about the beginning of the 16th century, when an alliance was entered into between Geneva and Friburg, the content continued, and was the occasion of many acts of oppression and persecution. When the treaty was concluded, in consequence of the active interference of a young citizen of Geneva, named Berthelier, two parties arose in Geneva, one of which retained an attachment to the interests of the duke of Savoy, and the other declared itself on the side of liberty. Thence of the latter description were called “Eignots,” which in Swiss, or High German, signifies “confederates by oath,” and from which the term “Huguenots” is probably derived; whilst those of the former were denominated “Mamalukes,” in reference to the Egyptian soldiery, who being originally Christians, renounced both their religion and liberty, to become slaves to the sultan. The duke, irritated by this conduct, entered Geneva with an armed force, and compelled the people to renounce their new alliance, whilst he perjured Friburg to withdraw from the treaty, promising not to injure the liberties of the Genevese. Berthelier, the Genevan patriot, was however sacrificed to his vengeance, and the magistrates of the city were deposed by the bishop. In the year 1526, a new alliance was formed between the towns of Bern, Friburg, and Geneva, which the duke of Savoy was not able to prevent, and occasioned wars of long continuance between the republic and Savoy. This alliance was confirmed by the bishop; and may be considered as the true era of the independence of Geneva. Soon after this period, viz. in 1533, the doctrines of the reformation were preached at Geneva by William Farel, a native of Gap in Dauphiné, and Peter Viret, of Orbe; and the people, animated by the enthusiasm of liberty, determined to emancipate themselves from the yoke of bondage, both ecclesiastical and civil. The bishop, who had always acted a weak and deceitful part, became despicable both to the Genevese and to the duke; and by his impudent menaces and precipitate retreat, served to strengthen the cause of the reformation. In 1535, the doctrines of the reformation were adopted in full council; and in consequence of this decision, the canton of Friburg renounced the alliance. In the following year, the famous John Calvin, driven from France by persecution, arrived at Geneva, and completed the reformation, that had been already begun by Farel and others. So great was the ascendency which Calvin, though a foreigner, acquired over the citizens, that he possessed considerable influence even in civil matters; and was eminently instrumental in settling the political constitution. To this end, as well as to encourage theological rudiments, he prevailed upon government to establish a public academy, the presidency of which he obtained for his friend and fellow labourer, Theodore Beza. In this new seminary, Calvin, Beza, and others, eminently for their superior knowledge, read lectures with such uncommon reputation and fascets, as attracted students from all quarters. It had also a public library, which owed its origin about this period to the liberality of Lionard, prior of St. Victor, who was twice imprisoned for having suffered, against the dukes of Savoy, the independence of Geneva. He was a principal promoter of the reformation by gentle means and gradual instruction. He closed his benefactions to his beloved city, by the gift of his valuable manuscripts and books, and by bequeathing his fortune towards the establishment and support of the seminary. Geneva was now regarded as the asylum of the reformed religion; and by the accension of persecuted protestants from other cities and countries, its arts and commerce flourished, and its population increased.

In 1584, Geneva concluded a treaty of perpetual alliance with Zürick and Bern, by which it formed a part of the Helvetic confederacy. The last attempt of the house of Savoy against Geneva took place in 1602, when Charles Emanuel attacked the town during a profound peace. The inhabitants, however, nobly defended themselves, repulsed the enemy, and obliged him to abandon his treacherous design. This perilous attack was followed by a war, which was terminated in the following year by a solemn treaty. Since that period, uninterrupted peace has been maintained between Geneva and the duke of Savoy; although the king of Sardinia did not, till the year 1734, formally acknowledge the independence of the republic. From that period, the history of Geneva contains little more than a narrative of contentions between the arithetocratic and popular parties. The constitution of Geneva, which had then been established, and which continued for several years, under a certain modification and improvement of the year 1768, was a kind of mean between those of the arithetocratic and popular cantons; more democratical than any of the former, as the sovereign and legislative authority were vested in the general assembly of the citizens; but more arithetocratic than the other, because the powers entrusted with the great and little councils were very considerable. The fabrics of the magistrates were so inconsiderable, as not to offer any temptation to pecuniary emolument; and the revenues of government, at the highest calculation, generally amounted to 36,000 pounds a year. Their constitution, indeed, was defective, as they had no precise code of penal law; but that of civil law was the most perfect part of their government. In Geneva, as well as in all the other principal towns of Switzerland, a public granary was established, and they had always in reserve a sufficient quantity of com to supply the inhabitants during a year and a half. Geneva was the only republic in Switzerland which had no regular companies of soldiers in any foreign service. Geneva was always more or less irritated by internal dissensions and tumults. In 1782, these had prevailed to such a degree, that the kings of France and Sardinia, together with the canton of Bern, interfered, and threatened to besiege the city. The peasants of the territory joined the Genevese, and offered to serve in their cause without pay, to mount guard, and work at the fortifications. M. de Jaucourt, the commander of the French troops, threatened, in case of resistance, to enter the town by force, and forbidden that no person should appear in the streets, that all arms should be delivered up, and that the chief of the “representants,” as the popular party was called, should retire from Geneva, and that the deposed magistrates should be reinstated. Resistance in these circumstances must have been altogether unwieldy, and unfit, indeed, have terminated in the destruction of the city. The representatives, therefore, restored the confined magistrates to liberty, and left the city in a body. The Sardinians, who first entered the gates, found the city almost deserted; and soon after the two other commanders
the commanders made their entry at the head of their respective troops, with drums beating and colours flying. The aristocratical party celebrated their triumph with balls, feasts and every species of public diversion. A committee, appointed by the great and little councils, prepared, in concert with the three generals, an edict for new modelling the constitution, which, being approved at the courts of Verfailles and Turin, and by the canton of Bern, was confirmed by the great and little councils. Much as the Genevans feared to deplore the consequences of this revolution, the change that was made in their constitution, and the diminution of that liberty to which they had been accustomed, and to which they ascribed the increase of their population and riches, the ferment was multiplied; and excepting the principal leaders, those of the popular party who were banished, and some few others who renounced their country under the influence of their political principles, the greater number of the emigrants returned, and again settled in the place of their nativity. According to Mr. Cooke, this revolution caused fearfully 600 persons to leave Geneva. The emigrants principally established themselves at Bruiss and Conflan; where they introduced manufactures of linen and of watches. A plan was also formed for giving an asylum to the Genevan emigrants in Ireland. (See New Geneva.) The form of government established in 1782 underwent another very considerable change in consequence of the revolution in 1789. The aristocratical party was obliged to yield, on this occasion, to the accumulative demands of the people; and when the solicitor-general, in the name of the citizens and burghers, requested the recovery of their ancient liberties, the permission of bearing arms, the re-establishment of the militia, and of their circles or political clubs, the removal of the garrison from the barracks, and the recall of the representatives banished in 1782; such moderate demands were received with satisfaction; and the new edict of pacification, under the title of "Modifications à l'Edit de 1782," was approved by the Senate, Great Council, and General Council. In this latter council, the "Modifications" were carried by 1321 suffrages against 52. The publication of the new edict was followed by loud acclamations and general rejoicings. This new constitution was judiciously modelled into a mean between the too popular form established in 1768, and the too aristocratical form established in 1782. It is natural to imagine that the widely extended influence of the French revolution would very soon reach the Genevan republic. Many, seduced by the principles of infidelity with by sedimented by Voltaire, and fascinated by the sifon of "Social Contract" of Rousseau, whom they proudly riled the philosopher of Geneva, became the apostles of licentious and democracy. Accordingly, a large party was predisposed to admit the French doctrines; and in the beginning of 1791, a club, called the "Circle of Light," gave energy and direction to the advocates of general equality. Their efforts were opposed by all the friends of the constitution, and two parties were again formed, which threatened the renewal of past commotions. In this crisis, emissaries from France exerted an inclination amongst the peasants of the Genevois, and a large body of them marched towards Geneva, to demand the extinction of the bourgeois. Although this first hostile attempt proved unavailing, the government, apprehensive of another insurrection, and anxious to remove every cause of complaint, granted additional privileges to the nation, and particularly general admission to the burgesses for the small sum of 6 sous guineas. (March 1791.) Soon after the abolition of monarchy, the Brissotins party, in conformity with their plan of surrounding France with a chain of petty republics, proposed to separate Geneva from the Helvetic confederacy, and either form it into a small dependent commonwealth, or incorporate it with the French republic. Although this attempt failed, the independence of Geneva was at length terminated, and it was incorporated, together with its territory, with the French republic in 1798; and now forms part of the department of Leman, (which fes.) Geneva, according to this new division, comprehends three cantons, 22 communes, on a territory of 125 kilometres. N. lat. 46° 12' 17"; E. long. 6° 5' 30". Mod. Uni. Hist. vol. xxx. Cooke's Travels in Switzerland, vol. ii.

Geneva, a populous town of America, in the county of Ontario, and state of New York, in the great road from Albany to Niagara, situated on the bank of the N.W. corner of Seneca lake, about 74 miles W. of Onondaga, and 52 W. of White Plains. It has nearly 100 houses. N. lat. 42° 52'. W. long. 74° 5.'

Geneva, Lake of, or Lake of Leman, a large lake of Switzerland, which stretches from Geneva to Villeneuve, being in length 54 miles, in the shape of a crescent; the hollow is formed by Switzerland, and the convex part by Savoy; the greatest breadth, from St. Sulpice to Grande Rive, is 12 miles. Savoy affords a rude and awful boundary of aspiring Alps, craggy and covered with ice of long standing. From Geneva to the environs of Lausanne the country, expects for, a considerable distance to the margin of the lake, is enriched with all the varieties which nature can bestow: the long ridge of the Jura, fertile in pasturage, and varied with woods, backs this beautiful tract. Near Lausanne the banks rise very considerably, and form a most charming terrace. A few miles beyond is a rapid descent. Near Vevey begins a plain, which is continued far beyond the end of the lake, but contracting, by the approach of the mountains, towards the lake. The colour of the water is extremely beautiful, clear, and at a distance seems of a most lovely blue.

Near Geneva the coast abounds in small pebbles covered with a brown incrustation; from thence, as far as Lausanne, the shores are sandy; between that town and Chillon appear ledges of rocks, hard and calcareous; and the extremity of the lake is a marsh formed by the collected mud of the Rhone. The depth is various; M. De Luc affirms, that on finding it, he had found the greatest depth to be 162 fathoms. The surface of the lake is said to be 1250 feet, and its deepest part 837 feet above the Mediterranean; like all inland lakes enclosed within high mountains, it is subject to sudden storms. The peaks of the tippet grebes, which appear in December and retire in February, because this lake is almost totally defiluite of reeds and rushes, in which they form their floating nest, are an elegant article of luxury, and fell for about 12 or 14 shilling each. This lake abounds in fish, remarkable both for their quality and size.

Geneva is also a lake in Upper Canada, which forms the western extremity of lake Ontario, to which it is joined by a short and narrow istnt.

Geneva, New, a thriving pop-town of America, on the bank of the Monongahela river, juft below George's creek, about 18 miles N. of Morgantown; this town is rendered famous as a place of much bustle, partly by the foundries, works in its vicinity, which not only supply the neighbourhood with window-glass, but also furnish large quantities down for the New England market. Here is also a paper-mill, and a manufactury for muskets. Small boats are also built in this place.

Geneva, New, a village of the county of Waterford, Ireland, nearly opposite to Duncannon fort, where many good houses were erected several years ago by government for the reception of the expatriated citizens of Geneva, but
they having relinquished the design of settling in Ireland, the place remains uninhabited.

Soon after the revolution of 1782, a memorial, signed by more than 1000 Genevans of both sexes, who were either persons of some property, or versed in trade or manufactures, expressing a desire of settling in Ireland, was presented to earl Temple (marquis of Buckingham) then the lord-lieutenant of Ireland. His Excellency, apprized of the advantage which would redound to Ireland from the reception of so many industrious artificers, many of whom possessed property in the English, Irish, and French funds, communicated, in September 1782, the proposal to the privy-council of Ireland for giving an asylum to the Genevan emigrants. This proposal, patronized by the lord-lieutenant, and unanimously consented to by the privy-council, was approved by the king. The Irish parliament voted 50,000l. towards defraying the expenses of their journey, and building a town for their reception; lands were purchased for 8000l. and part of the town was actually completed at the expense of 10,000l.; a charter was granted, with very considerable privileges; the island of gold was altered for the accommodation of the new manufacturers; the foundation of an academy; approved, upon a useful, extensive, and economical plan; in July 1783, several Genevans landed in Ireland; and when the nation had expended near 30,000l., the project was suddenly relinquished, and the settlement finally abandoned. The failure has been attributed to delays in the arrangement of fo court, from circumstances, occasioned by the high demands of the Genevan commissioners, who, in preparing the charter, required many privileges, that were contradictory to the laws of the land, and by the building of New Geneva. In consequence of these delays, and the remittance of the Genevans, many returned and took the oaths of allegiance to the new government. The project became gradually less popular; the few Genevans, who prematurely landed in Ireland, were discontented, at not finding the new town ready for their immediate reception; and the emigrants who possessed most property, having withdrawn their names, the rest wanted sufficient capital to settle in a foreign country, and to establish an extensive manufacture without still further assistance. In consequence of this deficiency, the Genevan commissioners petitioned to appropriate 10,000l. of the 50,000l. for the purpose of forming a capital. But, as that sum had been voted by parliament for other purposes, the petition was rejected; and the Genevans, in an address to the duke of Rutland, who succeeded Lord Temple as lord-lieutenant, relinquished the settlement, and soon afterwards quitted Ireland.

GENEVEVE, Str., a town of France, in the department of Paris; 6 miles W. of Paris.—Also, a town of France, in the department of the Aveyron, and chief place of a canton, in the district of Epinal; 27 miles N. of Rhodex. The town contains 1241, and the canton 6877 inhabitants, on a territory of 175 kilometres, in 17 communes.—Also, a town, or village, of America, in Louisiana, on the western bank of the Mississippi, 12 miles southerly of the city of New Orleans. It contained, some years ago, more than 100 houses, and 460 inhabitants, besides negroes. N. lat. 37° 35'. W. long. 90° 44.'—Also, a town of Canada, on the St. Lawrence. N. lat. 46° 38'. W. long. 72° 14.'

GENEVEVE, St. Genevieve, or St. Genevieve, fathers or religious of St. Genevieve, the name of a congregation of regular canons of the order of St. Augustine, established in France.

The congregation of St. Genevieve is a reform of the Augustinian canons. It was begun by St. Charles Faure, in Vol. XVI.

the abbey of St. Vincent de Senlis, whereof he was a mem- ber, in the year 1618.

In the year 1624, the abbey was made elective; and a general chapter, composed of the superiors of fifteen houses who had now received the reform, chose F. Faure, canon of the abbey of St. Genevieve, and general of the whole congregation. Such was its beginning.

It has since increased very much, and has consisted of above a hundred monasteries; some of which the religious are employed in the administration of the parishes and hospitals; and, in others, in the celebration of divine service, and the instruction of ecclesiastics in seminaries for the purpose.

The congregation takes its name from the abbey of St. Genevieve, which is the chief of the ordre, and whole abbot is the general of it. The abbey itself took its name from St. Genevieve, the patroness of the city of Paris, who died in the year 512. Five years after her death, Clovis erected the church of St. Genevieve, under the name and invocation of St. Peter, where her relics have been preserved, her shrines venerated, and her image carried with great processions and ceremonies, upon extraordinary occasions, as when some great favour is to be intreated of heaven.

GENEVEVE, in Geography, a bay on the W. coast of Newfoundland, in the fruits of Belleisle; 20 miles N. of St. John's bay.

GENEVOIS, or DUCHY of GENEVA, a province of Savoy-Bourbon, bounded on the N. by the Swiss territories, on the E. by Fauconay, on the S. by Savoy Proper, and on the W. by France, from which it is separated by the Rhône. Geneva and its territory formerly made a part of it. it is now annexed to France.

GENEVRAY, a town of France, in the department of the Ille; 10 miles S. of Grenoble.

GENEURO, a mountain which divides Piedmont from the ancient Dauphiny, in the road from Briançon to Sufs.

GENCA, Girolamo, in Biography, a painter of very considerable celebrity in his day. He flourished at the early period of the revival of the art, being born at Urbino in 1476. At the age of 15 he studied under Luca Signorelli of Cortona, then in great esteem, and acquired a master in most of his undertakings in different parts of Italy, but particularly at Orvieto, being acknowledged the best disciple of that school. He afterwards spent three years with Pietro Perugino, at the same time that Raphael was under the tuition of that artist; and that intercourse laid the foundation of a most cordial friendship between Raphael and Genga, which never was impaired.

He was highly encouraged by Guido-Baldo II., and his successor, Francesco Maria III., dukes of Urbino, in their palaces and theatres, and in designing triumphal arches. In Rome, Siena, Forli, Pisa, and many other places, he left behind him an incalculable number of works, both in painting and architecture, which were held in great esteem, and which procured him honour and riches. He died of a fever in 1551, aged 75, leaving two sons, one of whom, Bartolomeo, followed the profession of his father in the same style, and was moreover an eminent statistician and architect.

GENOA, Bernard, a doctor in philosophy and medicine, was born in the duchy of Urbino. He was a teacher of anatomy and surgery at Rome about the middle of the 17th century; and, according to Mangetus, surgeon to the hospital of the Holy Ghost in that city. He was a man of firm understanding, and maintained the doctrine of the circulation of the blood, which was not generally admitted in Italy; but he attributed the discovery of it to Paul Sarpi.

He
He also ventured to accuse Hippocrates of committing such errors, in the cure of several surgical diseases, as would not be pardonable in a student. His works are, 1. "Anastomia Chirurgica," or "Italia dell' offa e muscoli del corpo umano, con la descrizione de' vali," Rome, 1675, 1687. 2. "Anastomia per ufo ed intelligenza del disegno," Rome, 1691. This work contains some good figures of the ancient statues. Genga prepared the bodies, by disposing the bones and muscles in the forced attitudes of the gladiators in their combats, and Lanceti added explanations of the figures. 3. "Commentaria Latina et Italica ad Hippocratis Aphorismos, ad Chirurgiam pertinentia," Rome, 1694, 8vo. Bonon, 1697, 8vo. Elov.

GENGENBACH, in Geography, an imperial town of Germany, in the circle of Swabia, situated on the Kinzig, in the Ortenau: in this town is an abbey, whose prelate was a prince of the empire. Among the indemnities agreed on at Ratisbon in 1822, this town and abbey were given to the margrave of Baden: 15 miles S.E. of Strauburg. N. lat. 48° 27', E. long. 8° 1'.

GENGOU-LE-ROYAL, St., a town of France, in the department of the Saône and Loire; celebrated for its wine; 11 miles N. of Chuy.

GENIAL, GENIALIS, an epithet applied by the ancients to certain deities, whom they supposed to preide over generation. They were thus called a genus, from bearing; or, according to the correction of Scaliger and Vossius, a genus, to bear, produce: yet Feussel says, that they also were called geruli, which seems to require the former reading. M. Dacier, in a note, thinks that genera has the sense of gerula. Among the ancient gods, di geniades, says Feussel, were water, earth, fire, and air, which the Greeks called elementa. The twelve signs were sometimes also ranked in the numbers; as also the sun and moon.

GENICULATUS, CULMUS, in Botany, a straw bent like the knee, as in Alpecurus geniculatus; see CULMUS; and CAULIS, n. 19.

GENICULI, the joints or knees which appear in the shoots of plants; whence botanists call those marked there with geniculate plants.

GENIE. See Genius.

GENIES, St., in Geography, a town of France, in the department of the Aveyron, and chief place of a canton, in the district of Epeanon; 18 miles E.N.E. of Rodez. N. lat. 44° 28'. E. long. 3° 5'. The place contains 3335, and the canton 7988 inhabitants, on a territory of 2025 square kilometres, in 8 communes.—Allo, a town of France, in the department of the Gard; 9 miles N.W. of Nîmes.—Allo, a town of France, in the department of the Lower Alps; 6 miles N.E. of Sisteron.

GENII, in Mythology. See Genes.

GENILLE, in Geography, a town of France, in the department of the Indre and Loire; 3 miles N. of Loches.

GENIO-GLOSSUS, in Anatomy, (from γένιος, the chia, and γγλωσσα, the tongue,) a large muscle belonging to the tongue. See DEGLUTITION.

GENIO-HYOIDAEUS, from γένιος, the chia, and υιοιδας, an epithet given to the bone of the tongue, is a muscle belonging to the hyoides. See DEGLUTITION.

GENIO-PHYANGUS, from γένιος and φυναγας, a name given by Winckle to a particular leaf of the concomitant pharyngeus superior.


Gen. Ch. Col. Perianth inferior, turbinate, permanent, with five acute segments. Cor. of one petal, funnel-shaped; tube dilated upwards, longer than the calyx, its orifice becket; linth spreading, in fine deep, ovate, rather pointed segments, as long as the tube. Stam. Filaments five, short, in the tube of the corolla; anthers oblong, prominent. Pist. Germen superior, ovate, lyre thread-shaped, longer than the tube; stigma cylindrical, obtuse, furrowed. Peric. Capsule oblong, of two cells. Seeds numerous, somewhat angular, ranged along a thread-shaped receptacle.

Eff. Ch. Corolla funnel-shaped, bearded at the mouth. Calyx inferior, with five segments. Stigma cylindrical, abrupt, furrowed. Pericarp of two cells, with many seeds.

1. G. supfllilis. Forst. Prod. 17. Native of rocky places in the island of Tanna. Stem shrubby, climbing without tendrils, branched in an opposite manner, round, with a smooth grey bark. Leaves opposite, about three inches long, elliptic-lanceolate, pointed, entire, slightly wavy, smooth, opaque, with one rib, and a few remote, curved, interbranching veins. Fossilatak tender, smooth, channelled, half an inch long. Stipules infratransverse, united, short, acute, rather membranous. Flowers small, in foliary, few or opposite, somewhat downy, axillary panicules, rather longer than the flowers. Bracteas short, acute, united at their base, in pairs under each fork of the panicle. Calyx minutely fringed. Corolla apparently reddish.—From one of Forster's own dried speciments. Jullien probably never saw the plant, or we think he would have referred it to his Apincus. No figure has been published, except of the fructification.

GENIPA. (See GENIOPA.) The name is barbarous, of Well Indian origin, and appears to be sometimes called Genipat. See Tournefort, 658.

GENIPABU, in Geography, a river of Brazil, which runs into the Atlantic, S. lat. 5° 35'. W. long. 34° 46'.

GENIS, St. a town of France, in the department of the Lower Charente, and chief place of a canton, in the district of Jonzac; 24 miles S. of Saintes. The place contains 852, and the canton 12,600 inhabitants, on a territory of 2125 square kilometres, in 17 communes.—Allo, a town of France, in the department of Mont Blanc, and chief place of a canton, in the district of Chamley, near the confluence of the Rhône and Saône; 15 miles W. of Chambéry. The place contains 1550, and the canton 7962 inhabitants, on a territory of 1126 square kilometres, in 12 communes.

GENIS la Val, St. a town of France, in the department of the Rhône, and chief place of a canton, in the district of Lyons; 4 miles S. of Lyons. The place contains 2400, and the canton 15,522 inhabitants, on a territory of 973 square kilometres, in 10 communes.

GENISTA, in Botany, Green-weed, or Dwarf Broom. The etymology seems not very clear, either from genis, a knece, in allusion to the bending of the twigs, or from gens, to produce, because it grows wild in abundance; yet such are proposed by the learned, and we have no better to offer. Linna. Gen. 368. Schreb. 488. Willd. Sp. Pl. v. 3. 976. Sm. Pl. Brit. 754. Mart. Mill. Dict. v. 2. Jull. 303. Lamarck Illutr. t. 619. Garret. t. 131 Chas and order, Diandepha Decandria. Nat. Ord. Papilionaceae. Linna. Leguminosae, Jull.

Gen. Ch. Cal. Perianth inferior, of one leaf, small, tubular, two-tipped; the upper lip with two teeth, more deeply divided;
GEN

divided; lower with three nearly equal teeth. Cer. papilionaceous: standard oblong, remote from the keel, entirely reflexed; wings oblong, lax, shorter than the other petals; keel straight, emarginate, longer than the standard. Stam. filaments ten, all united, emerging from the keel; anthers simple. P.)' Germen oblong, envelope by the common filament; style simple, directed upwards; stigma acute, involute. Peric. Legume roundish or oblong, turgid, of one cell and two valves. Seeds several, mottly kidney-shaped, with a smooth elevated border round the scar.

Eff. Ch. Calyx two-lipped, the upper lip with two teeth, lower with three. Standard oblong, bent backwards from the rest of the flower.

A genus of shrubs, almost entirely European, with tough angular stems and branches, either ternate or simple leaves, and yellow flowers. Willdenow has twenty-five species, eighteen of which are unarmed, the other seven furnished with spines, in many instances remarkably compound. The spiny ones have all simple leaves. Three Genus are native of Britain.

G. tinctoria. Engl. Bot. t. 44. Dyer's Green-weed. So called from its use in dyeing yellow, and, with the addition of wood, green. Ray says it gives a better flavour to the milk of cows that feed upon it.

G. pilosa. Engl. Bot. t. 208. Hairy Green-weed, or Petty Whin. This is our only spiny species, and its spines are very conspicuous, long, simple, and spreading. Stem of humble growth, but nearly erect. Flowers not inlegant, turning green when dried. It is frequent on moor turfy or finely heaths, blooming in May and June.

G. candida, G. flava, and G. virgata, are hardy garden plants, worthy of cultivation for their beauty or singularity. The first especially has a flowery appearance when trained against a wall. G. canariensis, and Cynfolia. Curt. Mag. t. 442, are rather greenhouse shrubs, and the latter is very elegant on account of its silky filery leaves. It grows in Switzerland as well as in Spain, but like many other alpine plants, does not well bear our winters.

GENISTA, in Gardening, comprehends plants of the low shrubby evergreen and deciduous kinds, of which the species chiefly cultivated are, the common dyer's broom (G. tinctoria); the painted broom (G. fasciculata); the Spanish dyer's broom (G. florids); the hairy broom (G. pilosa); the English genista petty-white, or needle furze (G. Anglica); the hoary genista, or Montpelier Cyrus (G. candidans); and the Canary genista or Cyfocso (G. cumaranica).

Method of Cultus.—The six first sorts are all of the hardy kind, and capable of being increased by sowing the seeds in beds of common mould, and, which is better, in the borders or clumps where they are to remain, but which should be done in the early autumnal or spring season, though the former is by much the better, as a great deal of time will be saved. In cases where they are raised in beds, the plants should be carefully taken up and renewed, as soon as they have attained about twelve months' growth, into the situations in which they are to continue. In the latter mode of cultivation, they however require no other management than that of properly thinning them out, and keeping them free from all sorts of weeds.

The leaf, or Canary furf, may likewise be raised by sowing the seeds in pots of good garden mould in the spring season, but the aid of a moderate hot-bed is necessary to bring them forward. As soon as the plants have acquired a little growth they should be removed into separate small pots, and be immediately replanted in the hot-bed. In their after-management they demand the same sort of attention as other kinds of tender kinds of green-house plants.

Each of the first six sorts is proper for the more forward parts of the clumps and borders in ornamented grounds, and have a good effect from the fine appearance of their flowers.

The last kind produces a variety among other evergreen plants in the green-house collection.

GENITA BRIDGE, in Geography, a town of America, in Powhatan county, Virginia, 166 miles from Washington.

GENITA-mand, in Mythology, a goddess who presided over child-birth, to whom the Romans sacrificed a dog.

GENITAL, in Anatomy, formulating that relates to generation; which see.

GENITAE, are sometimes used in the ancient Roman poets for those we otherwise call indicia.

Anson is, in the argument of the fourth book of the Aeneid, takes the word in a different manner: the di genitai, he observes, were such as were not born of human parents, and were not thus called quasi genitae ex hominibus, but rather because they themselves had begot human children.

GENITALIA, or GENITORES, in Anatomy, a name sometimes given to the testicles or testicles of a man, on account of their office in generation, which see.

GENITE, in Geography, a town of France, in the department of the Corrèze; 18 miles W. of Brive.

GENITID, in Geomeby. See GENITAE.

GENITAE, in Mythology, called Gentils, among the Hebrews, those that descended from Abraham, without any mixture of foreign blood.

The Greeks distinguished by the name of genitea fuch of the Jews as were hid from parents who, during the Babylonish captivity, had not allied with any gentile family.

GENITIVE, in Grammar, the second case of the declensions of nouns.

When one thing is represented as belonging to another, in the relation of cause, origin, or author, its name has a termination given to it, called the genitive case; and as the author is properly the owner of a thing, the genitive is also called the possessive case.

In English, the genitive case is made by prefixing the particle of; or it is expressed by an apostrophe, with the letter s coming after it, as "thy father's house;" when the plural ends in s, the other s is omitted, but the apostrophe is retained, as "on eagles' wings," sometimes also, when the singular terminates in s, the apostrophe is not added; as "for righteousness' sake." In French the genitive is expressed by de, or du, &c. though, in italics, there are no cases at all, or at most only one, in either the French languages, insomuch as they do not express the different relation of things by different terminations, but only by additional prepositions. (See CASE.)

An ingenious grammarian observes, that though the termination called the genitive case be rendered by of, it means invariably from, beginnings, motion: and this, he says, seems to be the true signification of of, if we regard its etymology, it being taken from, ad, e in, from; and though custom seems to have allotted it some different undetermined meaning, it is in all cases resolvable into
the sense of from. Thus, a table of wood is a table from wood, wood being the origin or beginning of it. Again, he is sick of love, i.e. sick from love, love being the cause of his sickness; and so in other alliterations. And this is the reason why some prepositions which signify origin or beginning in Greek, Latin, and French, are rendered in our tongue by of. Jones's Greek Grammar, p. 194.

In the Latin, this relation is expressed in divers manners, thus we say, ceput hominis, the head of a man; color rofæ, the colour of a rose; opus Dei, the work of God, &c.

As the genitive case serves to express very different; and even opposite relations, there sometimes arises an ambiguity from this circumstance; thus, in the phrase, vulbus Arcebis, the wound of Achilles, the genitive, Arcebis, may either signify passively the wound Achilles has received, or actively the wound Achilles has given: thus in this passage of St. Paul, Certus sum quod neque moris, neque vitæ, &c. non potest separare a caritate Dii in Christo, &c. the genitive Dii has been taken by interpreters in two different senses; some, giving it the relation of object, understand the passage of the love which the elect bear to God in Jesus Christ; whereas others give it the relation of subject, and explain it from the love which God bears the elect in Jesus Christ.

In the Hebrew tongue, the genitive case is marked after a manner very different from that of the Greek and Latin: for whereas in those languages the noun governed is varied, in the Hebrew the noun governing undergoes the alteration.

GENITO, Sr. in Geography, a town of Naples, in Calabria Citera: 21 miles N. W. of Bifignano.

GENIUS, in Mythology, a good or evil spirit, or daemon, whom the ancients supposed set over each person, to direct his birth, accompany him in life, and be his guard until death. Tho' that attended women were females, and called Junones, but those that attended men were males, and called Genii. They seem, in their original, to be nothing else but the particular bent and temper of each person defined; and as every one's own temper is in a great measure the cause of his happiness or misery, each of these was supposed to have, and have an equal feeling in all the enjoyments and sufferings of the persons they attended. (See Horace, lib. ii. ep. ii. ver. 189.) The ancients had their Genii of nations, of cities, of provinces, &c. Nothing is more common than the following inscription on medals: GENIUS POPULI ROM. "the Genius of the Roman people:" or, GENIO POP. ROM. "to the Genius of the Roman people." The ancient Gauls acknowledged Genii, who took care of each particular province and canton: but the foundation of the worship, which they paid to their deified cities, or rather to the genius who protected them, and became their tutelar divinity, was to engage them to take care of them, to defend them against enemies, and to remove from them all evils, with which they might be distressed; such as epidemic distempers, and other calamities. The names of these tutelar Genii were kept secret, lest, if they should be known, they should be conjured away, and forced to abandon the cities that were committed to their charge, and pass into others, where they were promised a more solemn worship.

In this sense, genius and lar were the same thing; as, in effect, Centorinius and Apulian affirm they were.

Of these genii or demons, Plato supposes that every man has his own, who is his guardian, and the witness, not only of his actions, but of his very thoughts; but that, at death, the genius delivers up to judgment the person who had been committed to his charge; and if, when the person is interrogated by the judge, his answer be found not agreeable to truth, the genius condones and reprimands him very severely, as, on the other hand, he pronounces an excomium upon him when what he says is true; and it is upon the approbation of the genius, that the doom is pronounced; for this daemon knows whatever passes in the man, even his most secret thoughts.

Although Plato and Jamblichus were of opinion that every individual had but one of these genii to conduct him, and to preside over all his actions, other philosophers of the same school were perfused, that he had two, the one good, the other bad. To this purpose Servius upon Virgil (Æn. i. vi. c. 743.) says, "Volunt unicumque genus oppositum, Damo- nem bonus et malum: hoc est, rationem quae ad meliora feren tur hastatur, et libidinem quae ad peorja; hic est Larva et genius malus; ille bonus genius et Lar. "They will have that every one has two genii, the one good, and the other bad; that is, reason, which always excites men to good, and lust, which prompts them to ill: the latter is what they call "Larva," or evil genius: the other good Genius, or "Lar."

The Platonists, and other eastern philosophers, supposed the Genii to inhabit the vall region, or extent of air, between earth and heaven. They were a sort of intermediate powers, who did the office of mediators between gods and men. They were the interpreters and agents of the gods; communicated the will of the deities to men; and the prayers and vows of men to the gods. As it was unbecoming the majesty of the gods to enter into such trifling concerns, this became the lot of the genii, whose nature was of a middle kind between the two; who derived immortality from the one, and passions from the other; and who had a body framed of an aerial matter. Most of the philosophers, however, held that the genii of particular men were born with them, and died. Thus Plutarch attributes the ceasing of oracles partly to the death of the Genii.

The heathens, who considered the Genii as the guardian spirits of particular persons, believed that they rejoiced and were afflicted at all the good and ill fortune that befell their wards. They never or very rarely appeared to them; and then only in favour of some person of extraordinary virtue or dignity. They likewise held a great difference between the Genii of different men; and that some were much more powerful than others; on which principle it was, that a wizard in Appian bids Antony keep at a distance from Octavius, because Antony's Genius was inferior to, and stood in awe of, that of Octavius.

There were also evil Genii, who took a pleasure in perverting men, and bringing them evil tidings; such was that in Paterculus, &c. which appeared to Brutus the night before the battle of Philippi. These were also called larves, and lemures.

According to the theogony of Hesiod, the men of the golden age became demons, or good genii; tho' according to him, are the guardians of men, the earth having fallen to their lot. Tho' of the silver age there were changed into men, or subterraneous genii, happy though mortal. Tho' of the brazen age went down to the infernal regions. Tho' of the heroic age took possession of the Fortunate Islands, of the Elyian fields, atuate at the extremities of the world. See DIONYX, and DIONYSUS OF SORATES.

The Mahometans also admit the existence of Genii, supposed by them to be a class of intermediate beings, between angels and men; of a groffer fabric than the former, and more active and powerful than the latter. Some of them are good, and others bad; and they are, like men, capable of future salvation or condemnation.

Genius is more frequently used for the force or faculty of the soul considered as it thinks or judges.

Thus, we say, a happy genius, a superior genius, an elevated genius, a narrow confined genius, &c. in like sense we also say, a work of genius, a want of genius, &c.
Genius is also used, in a more refined sense, for a natural talent, or disposition to one thing more than another. In which sense we say, a genius for verse, for the sciences, &c. Dr. Blair, in his "Lectures on Rhetoric, &c." (vol. i.) distinguishes between Taste and Genius. Taste, he says, confines in the power of judging: Genius, in the power of executing. One may have a considerable degree of taste in poetry, eloquence, or any of the fine arts, who has little or hardly any genius for composition or execution in any of those arts. But genius cannot be found without including taste also. Genius, therefore, deserves to be considered as a higher-power of the mind than taste. Genius always imports something inventive or creative; which does not reit in mere facility to beauty, where it is perceived, but which can, moreover, produce new beauties, and exhibit them in such a manner, as strongly to impress the minds of others. Refined taste forms a good critic: but genius is further necessary to form the poet, or the orator. Besides, genius is a word, which, in common parlance, extends much farther than to the object of taste. It is used to signify that talent, or aptitude, which we receive from nature, for excelling in any one thing whatever. Accordingly, we speak of a genius for mathematics, as well as a genius for poetry: or a genius for war, for politics, or for any mechanical employment. This talent or aptitude, for excelling in any one particular, is received from nature; and though it may be greatly improved by art and study, it cannot be thereby alone acquired. As genius is a higher faculty than taste, it is more limited in the sphere of its operations. Whilfl we find many persons, who have an excellent taste in several of the polite arts, such as music, poetry, painting, and eloquence, all together; it is much more rare to meet with one who is an excellent performer in all these arts. Indeed, an universal genius, or one who is equally and indifferently turned towards several different professions and arts, is not likely to excel in any. The rays must converge to a point, in order to glow intensely. A genius for any of the fine arts always supposes taste; and the improvement of taste will serve to forward and correct the operations of genius. But genius, a poet or orator, may sometimes excel in a higher degree than taste; that is, genius may be bold and free, when taste is neither very delicate, nor very correct. This is often the case in the infancy of arts; a period when genius frequently exerts itself with great vigour, and executes with much warmth; while taste, which requires experience, and improves by flower degrees, hath not yet attained its full growth. Homer and Shakspere may be referred to as examples in proof of this assertion. (See Taste.) Longinus, in his "Treatise on the Sublime," remarks, that liberty is the nurse of true genius: it animates the spirit, and invigorates the hopes of man; excites honourable emulation, and a desire of excelling in every art. It is observable, that writers and artists most distinguished for genius have generally appeared in considerable numbers at the same period. Besides the moral causes which have been alleged to account for this phenomenon, such as favourable circumstances of government and manners, encouragement from great men, and emulation among men of genius, the Abbé du Bos, in his "Reflections on Poetry and Painting," has collected a great many observations on the influence which the air, the climate, and other natural causes, may be supposed to have upon genius. The opinion of the Abbé du Bos, that genius chiefly depended on soil, food, air, and climate, has been favoured by Montesioue in his "Spirit of Laws?" and it occasionally occurs in other writers. Mr. Hume, however, has attacked this hypothesis with great ingenuity and strength of reasoning in his "Essay on National Cha-

racters." In that Essay he has clearly proved, that the differences we observe in nations, with regard to genius, science, and manners, arise from moral, and not from physical causes. (See Climate.) The fact, however, is unquestionable, that some periods or ages of the world have been much more distinguished than others for the extraordinary productions of genius. (See Age, in the History of Literature, &c.) If we institute a comparison between the ancients and moderns in this respect, we must allow, that while the advancing age of the world brings along with it more science and more refinement, its earlier periods may lay claim to more vigour, more fire, more enthusiasm of genius. Among the ancients, we find higher conceptions, greater simplicity, more original fancy; among the moderns, sometimes more art and correctness, but feckless exertions of genius. Admitting this to be in general a mark of distinction between the ancients and moderns, it cannot be admitted without exceptions; for, in point of poetical fire and original genius, Milton and Shakspere are not inferior to any poets in any age.

Genius, is not a musical term, nor does it appertain to one of the polite arts more than another; but Roufeau (Dict. de Mus.) has volunteered an article for it among musical terms, and has written it with peculiar eloquence and enthusiasm.

Roufeau, paradoxical on almost all other subjects, is sometimes not only capricious, but mitchievous; yet his bitterest enemies admit, that music is his bright side: and though he is not allowed by the present French musical critics to be a profound contrapuntist, yet his taste in music and poetry was refined, and of the highest class; and his views concerning dramatic music were enlarged, rational, ingenious, and free from all caprice and paradox.

Genlis, in Geography, a town of France, in the department of the Côte d'Or, and chief place of a canton, in the district of Dijon. The place contains 707; and the canton 8590 inhabitants, on a territory of 1871 square miles, in 27 communes.

Gennala, a town of Peru, in Farflian, in the Persian Gulf; 15 miles N.W. of Bender Riga.

Gennadius I., in Biography, patriarch of Constantinople, was elected to that dignity, having been some years an ordained prebendar of the church, in the year 458, on the death of Anatolinus. In the following year, in a council of 73 bishops, he procured the passing of a canon against monochasical ordinations, and established the equitable regulation, that the oblations made in the churches, which it had been customary to claim for the patriarch's treasury, should thenceforward belong to the officiating clergy. He died in 471, leaving behind him a high character for great zeal and disinterestedness in correcting the relaxed state of discipline which prevailed in his time. He is placed by those who lived about the same period among the ecclesiastical writers of the day, and is applauded for the extent of his learning and the elegance of his style. The proofs of this have not come to us, excepting in "A synedrit Epitaph" against anodyne, inserted in the fourth volume of the Collect. Concil.; and fragments against the anathemas of Cyril of Alexandria, quoted by Facundus, bishop of Harnia: and another from a treatise addressed to Parthenius, and quoted by Ioan. Moretii.

Gennadius II., another patriarch of Constantinople, in the fifteenth century, assumed the name upon embracing the ecclesiastical life, having, prior to this, the name of George Scholarius. He was a native of Constantinople, where he was educated, and attracted much notice by his talents and remarkable progress in the different branches of learning. He became secretary to the emperor John Paleologus,
and afterwards chief judge of the Greeks. In 1438 he accompanied the emperor to the council at Florence for the purpose of bringing about an union between the Greek and Latin churches: it is, however, a matter of much doubt whether Scholarios was in favour of the measure which his duty to his master required him to function and support. After his return to Constantinople he united with Mark of Ephesus, in opposing the reception of those terms of union to which the emperor had acceded, as well by his influence as by his writings, which brought on him for a time the displeasure of the emperor. After the death of Palaeologus in 1448, Scholarios was as violent as ever against the proposed union, and finding that his opposition must subject him to danger with the new emperor, Constatine, he resolved to relinquish his civil employments, and to embrace the ecclesiastical life. He accordingly, in 1450, after finding a valid动力 of oration to the emperor, entered into a monastery adjoining Constantinople, and lived a secluded life for two years, which is supposed to have been the result of the emperor's orders, to prevent him from taking part against the proposed union. During his retreat from the world he composed several homilies, which could offend no one; but he did not engage in any controversy until the union was completed. This called forth his zeal in behalf of the Greek church: he wrote letters to all the ecclesiastics of Constantinople, and to the different monastic orders, exhorting them to adhere to the faith of their ancestors, and not to submit to the Florentine union: he also renounced with the emperor on the subject, but the monarch was not to be turned from his plan, and made every effort, by persuasion and by threats, to bring over Gennadius. The attempt was fruitless; he had gone too far to retract, and had obtained a multitude of adherents whom he had converted by his writings and exhortations, which represented the union to be a defection of the cause of God and his truth. The emperor subordinated the act of union at Constantinople, as it had been ratified in the council of Florence. On the 12th of December 1452, the two nations, in the church of St. Sophia, joined in the communion of sacrifice and prayer. But the dregs and language of the Latin priest who officiated at the altar were objects of scandal; and it was observed, with a feeling of horror, that he consecrated a wafer of unleavened bread, and poured cold water into the sacramental cup. From the dome of St. Sophia, the inhabitants of either sex, and of every degree, rushed in crowds to the cell of Gennadius to confound him, as the oracle of the church. He was invincible, and entranced, as it should seem, in deep meditation, or divine rapture; but he had expiated on the door of his cell a tablet, on which were written these words: “O miserable Romans, why will ye abandon the truth; and why, instead of confiding in God, will ye put your trust in the Italian? In abandoning your faith, you will lose your city. Have mercy on me, O Lord! I protest, in thy presence, that I am innocent of the crime. O miserable Romans, confider, pause, and repent! At the same moment that you renounce the religion of your fathers by embracing impiety, you submit to a foreign servitude.” This was the signal for insurrection, (see Constantinople); and, after the capture of the city, the sultan Mahomet, deeming of concluding those inhabitants who had suffered the immense slaughter made by his army, and of recalling the Greeks, who had escaped, to their deserted houses, ordered Gennadius to be sought for, and offered him to the choice of the clergy and people, by whom he was immediately elected their patriarch. In the election and investiture of Gennadius, the ceremonial of the Byzantine court was revived and initiated. With a mixture of satisfaction and indignation, they beheld the sultan on his throne, who delivered into the hands of Gennadius the pastoral staff, the symbol of his ecclesiastical office, who conducted the patriarch to the gate of the ferglio, preferred him with an horde richly caparisoned, and directed the vizirs and bashaws to lead him to the palace which had been allotted for his residence. The churches of Constantinople were shared between the two religions: their limits were marked, and till it was infringed by Selim, the grandson of Mahomet, the Greeks enjoyed above forty years the benefit of this equal partition. Gennadius presided over the see of Constantinople between five and six years, when he resigned his dignity, and retired into a monastery. He died about the year 1450. He was the author of “An Explanation of the Christian Faith, delivered before the Turkish emperor Mahomet.” This work was the result of a long conversation which he had with the emperor, soon after his installation, when Mahomet suffered him to produce all the arguments he was able in support of the truth of Christianity. It is to be found in Cudinus’s Tucur-Gracian; and is also in David Chytraeus’s “De Gratia Ecclesiastica in Gracian.” Gennadius wrote likewise a treatise concerning predestination, and another on the trinity. He composed many homilies in the early part of life, which were delivered before the emperor, as orations, which laymen were, in that age, accustomed to pronounce in the imperial dining-room. Moreri. Gibbon’s Hist.

**Gennadius,** an ecclesiastical writer, flourished towards the close of the sixth century, and became priest of Mesphiles. He was a great writer, and is said to have composed eight books against all heresies, five against Nestorius, three against Pelagius, and a treatise concerning the millennium and the book of Revelation. The most notable of this author was entitled “De viris illustribus,” which is a continuation of St. Jerome’s catalogue of Ecclesiastical Writers; and a treatise “De Fide, de dogmatibus Ecclesiasticis Liber ad Gelasium Papam missus.” This last was for a considerable time attributed to St. Augustine, and was generally inserted in the editions of his works. The time of Gennadius’s death is not known, but it did not take place before the year 395.

**Gennari, Cesare and Benedetto,** two brothers who both made painting their profession. They were nephews, heirs, conspirators, and imitators of Guercino; they frequently repeated his pictures, but not with adequate sweetness or force. At first they worked together at several places in Italy; but separating, Cesare remained at Bologna, and Benedetto went to England, where there are many of his works, particularly at Windsor Castle, discoverable by a labourer, dry imitation of Guercino; with a mixture of the flutter and parade exhibited by the French painters of that period. He was made painter to James II. and executed a picture of that prince and his family. At their expulsion he returned to Italy; and as his manner, by the mixture of French art he had introduced, was novel, he obtained applause and employment. He died in 1715, aged 82.

**Gennes, in Geography,** a town of France, in the department of the Maine and Loire, near the Loire; 9 miles N.W. of Saumur.

**Gennes,** a town of France, in the department of the Ruer, situated on the Niers, near the Meuse. It contains two churches, one for Roman Catholics, and another for Protestants; 9 miles S.S.W. of Cleves. N. lat. 51° 47′. E. long. 5° 50′.

**Genelles,** a town of France, in the department of the Maine and Loire, and chief place of a canton, in the district
GENOA.

trick of Saumur; 5 miles N.E. of La Guerche. The place contains 14,550, and the canton 8,248 inhabitants, on a territory of 190 kilometres, in 15 communes. 

GENOA, and since the French revolution the “Ligurian republic,” is a small, mountainous territory, in the northern part of Italy, forming a kind of crescent along the Mediterranean sea on the south, and covered on the land side by the Apennines, which separate it from the countries of Milan, Piedmont, the Montferrat, the Milanese, and Parmisan. Its length from the town of Vintimiglia on the west, almost to the territory of the republic of Lucca on the north, measured every where on the sea to the interior of the country, is not more than 20 miles. The mountains that enclose it are, in some places, covered with forest, in others they are barren rocks, and in some few parts they yield excellent pasture. There is but a small quantity of arable land in this country, so that it is under a necessity of seeking a supply of corn from Naples, Sicily, and other places; but the inhabitants avail themselves of every spot which is capable of cultivation. They are furnished throughout the year with excellent legumes and vegetables for the table; they also make a considerable quantity of wines, and are amply provided with various kinds of fruit, especially citrons, oranges, pomegranates, almonds, and figs. They raise a great number of mulberry trees for feeding silk-worms, and olives grow in great plenty, particularly round the gulf of Spezzia. Salt is produced for exportation. The Apennines, and some other hills, supply them with excellent marble, while Polzera, in the Boscutta, yields the beautiful stone so called, being serpentine of various colours veined with marble, which is so closely covered by a magnificent traffic formed, in 1798, from the Boscutta, or mountains to the north of Genoa, through the Polvera, by three years' labour of from five to eight hundred men, at the expense of one patriotic and noble family, the Camiati. The inhabitants of this country, amounting to about 400,000, are Roman Catholics, though the papal power is not much venerated; the people being devoted to commerce, and disposed to receive money heretics, without any religious scruples. The manufactures were formerly very considerable, but they have of late declined; the principal are velvet, plush, damask, different kinds of silk, for which they are supplied with the raw material from Messina and other places; gold and silver fillets, lace, gloves, stockings, ribbons, soap, paper, &c. Other articles of commerce are, oil, fruit, macaroni, confectionary, Parmesan cheeses, anchovies, &c. Although Genoa is a free port, Leghorn, which is likewise free and indulged with greater liberty, interferes with its trade, and diminishes it. This country is part of the ancient Liguria (see Liguria; which, in the second Punic war, espoused the interest of the Carthaginians; but the city of Genoa, which was then a celebrated emporium, taking part with the Romans, was plundered and burnt by Mago the Carthaginian. It was afterwards rebuilt by the Romans, and continued under their dominion, together with the rest of Italy, till the conclusion of the fifth century, about A.D. 498, when Theodoric, king of the Goths, having defeated the usurper Odoacer, was proclaimed by the army king of Italy, even with the consent of the emperor Zeno. Genoa was afterwards recovered by Belisarius, when he entirely subdued the Goths; and when the Lombards invaded Italy, this city remained for some time unoccupied, deriving an ascension of wealth and inhabitants by the refugees who fled from the vicinity of the Po, in order to escape the fury of the invaders. At length, in the seventh century, Genoa was plundered and burnt by the Lombards, and remained under their power till Italy was conquered by Charlemagne, when the territory of Genoa, distinguished by its wealth and populousness, was erected into a marquisate. It soon afterwards became so powerful, under the Genoese empire, and after it had obtained a kind of independence, that, in 805, it reduced the island of Corfica, and in 935 defeated the Saracens, who had plundered and burnt the city, in their return to Africa, on the coast of Sardinia. About the year 950, when the Franks having lost all authority in Italy, the Genoese began to form themselves into a kind of aristocratic republic, under a chief called doge, (see Doges,) and in two years, and to be governed by their own magistrates, who were freely elected, and took the name of consuls. In order to maintain their independence, they applied, with great address, to navigation and commerce, and thus became rich and powerful. Their commerce extended from Spain to Syria, and from Egypt to Constantinople, and was carried on in vessels, that were fitted for war as well as traffic. In the year 1017 they united with the Pisans in an expedition against Sardinia; and about 33 years after this expedition, the Genoese and Pisans were engaged in a destructive war, which lasted nearly 18 years; but when a treaty of peace and alliance was concluded between them, they continued in a successful expedition against the Moors, in Africa. What contributed more than any other circumstance to the opulence and grandeur of the Genoese, was the part they took in the crusades, and the important services they rendered to the religious warriors, towards the close of the eleventh and commencement of the twelfth centuries. During the latter century, they subjected the half of Sardinia, and the city of Savona: they also made themselves masters of the Black sea, formed establishments in the Crimea and in the suburbs of Pera, at Constantinople, where they remained till the Turks took that city. In the thirteenth century, they added to their conquests the towns of Albenga, Savona, Vintimiglia, and others in their neighbourhood; and for the superiority of the sea, they engaged in a long and obstinate contest with the Venetians, which did not terminate till the year 1381. In their various conflicts with neighbouring powers, their strength was enfeebled, so that, in 1471, they were expelled from the Crimea; though their maritime power still continued respectable. Exposed by the Venetian war, in particular, Genoa offered voluntary subjection to France and to Milan; but after many revolts and conflicts, with a view of recovering their independence, they were at length, in 1528, reduced from the dominion of foreign princes, by the vigorous exertions of Andrew Doria. Doria, having driven out the French, and gained possession of Genoa, restored the nobility, and restored the government into their hands, declaring that he pretended to no greater share in it than became him as a nobleman. He re-established the ancient form of the republic, and received from his country all those testimonies of gratitude, which a conduct so disinterested seemed to deserve. (See Doria.) Towards the end of the sixteenth century, Genoa was distracted by a civil war; but after a reconciliation had been effected between the two contending parties, distinguished by the appellations of the old and new nobility, the republic enjoyed peace and felicity for an interval of 48 years, during which period scarcely an incident, domestic or foreign, occurred, that is worth recording. In the year 1624, a dispute arose between the republic and Charles Emanuel, duke of Savoy, in which Lewis XIII. bore a share; and a treaty was concluded between France and Savoy, that was hostile to the Genoese. On this occasion the Spaniards declared in favour of Genoa and a
peace with France and Savoy restored the republic to its former situation, at the commencement of the war. In 1646, the Spaniards attempted to surprize the city; but their enterprise was frustrated; and from this time till the year 1659, Genoa enjoyed all the blessings of peace and commerce. In the following year, Hippolito Centurion, the Genoese admiral, gained several advantages over the corsairs of Barbary, which paved the way for a treaty of commerce that was concluded with the piratical states, and the grand signor. The treaty with the Porte was considerably extended by the marquis Durazzo, who went in quality of ambassador to Constantinople in the year 1666. The refit of this treaty renewed the vigour of the Genoese trade, to a pitch beyond what any of the maritime towns had experienced since the Dutch founded their commercial republic, and extended their trade not only to the Levant, but to every quarter of the globe. For some years Genoa lived in peace with all the neighbouring powers, enjoyed domestic harmony, and advantageously cultivated commerce, and whatever should render the republic powerful and happy. Some little jealousies and differences arose between her and Venice, theiffer and rival republic; but they were such as terminated amicably, and never caused any disturbance to the repose of Italy.

In the year 1683, the Genoese unfortunately incurred the resentment of Lewis XIV., who looked with jealousy on their attachment to Spain; and could not bear to see the republic under the protection of that crown. His attempts for humbling them proved too successful; but in consequence of their submission, and the interposition of the pope, peace was obtained. The terms stipulated by the French were peculiarly severe and oppressive; among others, they required that the doge and four councilors should appear in person at Versailles, in order to sue for pardon; and that the state should disarm all their galleys, fix excepted, with a promise not to fit out more, without the knowledge and consent of the king. During the ensuing war, kindled by the ambition of Lewis, which embroiled the greatest part of Europe, the republic of Genoa adhered wisely to a neutrality, and enjoyed the advantages of peace and commerce, while the dominions of their neighbour, Victor Amadeus, king of Savoy, were wasted by all the calamities of war. In 1713, Charles VI. fold the marquisate of Finale to the republic for a considerable sum of money. In 1725, the queen of Hungary, having at the treaty of Worms ceded to the king of Sardinia all her rights to the town and marquisate of Finale, and demanding that the Genoese should deliver up the marquisate, they entered into an alliance with France, Spain, and Naples; and, in 1745, declared war against the king of Sardinia who had made himself master of a great part of the state; several Genoese ports were bombarded by an English fleet; and the Imperialists seized upon the city of Genoa; but after a dreadful slaughter on both sides, they were again driven out by the inhabitants; and, in 1747, miscarried in their attempt to recover it. The treaty of Aix-la-Chapelle, in 1748, restored its tranquillity. The ancient nobility consisted of 28 families, whom Andrew Doria, in 1528, reparted from all the rest, and declared to be only capable of holding the chief offices and dignity of doge; all the other inhabitants being reduced by him to the class of contributors. Since that time it has been found necessary to create other nobility. The nobility of Genoa were allowed to keep manufacturies of velvet, silk, and cloth; to farm the duties, and to have ships in merchant vessels; but all other business and handicrafts were forbidden. The form of government in this republic was aristocratical; the chief being called doge. This government continued till the year 1798, when the French form was chosen, and the new style assumed of the Ligurian republic, confirmed by the more recent treaty of February 1801. The troops of this state, including the militia, may amount to about 30,000; and the fleet, annually to celebrate for its victories over the Saracens, the Pisans, the Venetians, Spaniards, and Turks, and for maintaining during a long period a considerable dominion over Sardinia, Corfica, Malta, Majorca, Minorca, Cadi, Cyprus, and many other places in and near the Mediterranean and Archipelago, and even the Black sea, the Crimea and other parts, is now reduced to a few galleys.

Genoa, or Jovia, frequently, though corruptly, called by the Latin writers Jonia, is the capital of the country described in the preceding article. It is situated partly on a level strand near the sea, and in part rises gradually to the top of the hill. It is about 10 miles in circumference, and is defended towards the land by a double wall. Several bastions are erected along the sea-shore, on rocks which appear above the water. The streets are in general narrow, but clean and well paved; two of which, called the *Strada Nuova*, and *Strada Belpoli,* are filled with magnificent palaces, fronted with marble. It is the seat of an archbishop. The cathedral is built in the Gothic style, and paved with black and white marble; in the treasury is preferred a curious hexagonal dish, said to be of a single emerald, found at Calvare in the time of the Crusades, which the Genoese received as their share of the plunder. Besides the cathedral, it contains 32 parish churches, some of which are magnificent, and adorned with sculptures and pictures by the best masters. The doge's palace is large, without decoration, except two statues of John Andrew Doria, and Andrew Doria, larger than life, at the entrance. The arsenal contains arms for 33,000 men, models for bridges, the armours worn by a number of the Genoese women in the crusades, a shield containing 120 piths, made by Julius Caesar Vezzo, for the purpose of affronting the doge and senate at one time. Other public buildings are the Albergo, which serves as a poor-house, and house of correction, where is a beautiful relique, the Virgin supporting a dead Christ, by Michael Angelo, and the assumption of the Virgin, which merits, by Puget, an inimitable piece of sculpture; a large hospital for the sick of all nations and religions; the conservatory, for educating and protecting 300 poor girls; and a great number of palaces belonging to the nobility; and the number of convents for men and women is reckoned to be 69. Such was the state of Genoa before the late revolution; what devastation it has suffered by its new masters, we are not able to say. It is certain, that the siege in 1799 was very destructive. The harbour is large and deep, but exposed to the south-west wind; but it has a mole for the security of gallies and small vessels; nevertheless the city is much exposed to a bombardment. The number of inhabitants is estimated at 80,000. N. lat. 44° 25'. E. long. 8° 58'.

Genoa Bar, a reef of rocks, extending some miles from the north coast of the island of Bahama. N. lat. 26° 20'. W. long. 79° 26'.

Genoa Balloon, in Medicine, the name of a famous composition, called also the baloon of Aquirapendente. Its great virtues are the curing pains in the extremities of the body, and allaying the violent pains in the bowels, to which many women are subject after delivery. The prescription is given at large in Velzecus, but the medicine is now out of use.

Genola, in Geography, a town of France, in the department of the Stura; three miles N. E. of Savigliano.

GenolHac, a town of France, in the department of
the Gard, and chief place of a canton, in the district of Alais; 15 miles N. W. of Alais. The place contains 1,502, and the canton 95,9 inhabitants, on a territory of 95 kilometres, in 14 communes.

GENOPLESIMUM, in Botany, from γένος, a genus, and πλῆςμα, a carly aitn, indicating its great affinity to Phylyphyllum, another new orchidean genus of Mr. Brown's. The name is but too expressive of many genera recently established, that it is wonderful no writer has hit upon it before. Brown Prod. Nov. Holl. v. 1. 319. Clafs and order, Cyandria Menardiana. Nat. Ord. Orchidae. Gen. Ch. Col. Perianth ringent, helmet-like in front, its two inner petals more longer and spreading. Cor. Petals, (inner calyx leaves of Mr. Brown,) attached below to the column. Necary, or lip, affembling, undivided, hooded at the base, without a spur. Style or column, cloven half way down, without any lateral membranous segments, in which last particular aline it differs from Phylyphyllum. Ammer parallel to the stigma, permanent, its cells close together. Malles of pollen not observed. The only species is

G. Baueri, seen by Mr. Brown growing near Port Jackson, New South Wales, but the above character was drawn up by him from Mr. Ferdinand Bauer's coloured figure.

GENOSA, in Geography, a town of Naples, in the province of Otranto; 10 miles S. E. of Otranto.

GENOVIUS, Anthony, in Biography, a man of letters, and philosopher, was born of parents of very moderate circumstances, at Castiglione, a small town in the district of Salerno, in the year 1712. He was intended for the church, and received an education suitable to the purpose. An early attachment to the daughter of a neighboring peasant induced his father to place him, at a distance from home, under the care of a lay ecclesiastic, who was an able classical scholar, as well as deeply skilled in theology and jurisprudence. Here the young man made such progress in learning as astonished all about him. His resolution to marry the object of his love created in him a zeal and diligence that surmounted all difficulties; but, however, he was in a situation to maintain a wife, and, at the instigation of his father, married. This disaffection made him resolve to devote himself to the church, and he was in due time consecrated a priest, and obtained the patronage of the archbishop of Conza. Unfortunately for Genoveli the prelate died, which made him repair to Naples to follow the practice of the law, an employment highly lucrative in that city. He was soon dissatisfied with his business, and after diligently studying the elements of modern and ancient philosophy, he obtained the office of extraordinary professor of metaphysics. He began his lectures in November 1741, and his school was crowded with pupils; the boldness of his manner, and the novelty of many parts of his system, excited his enemies, who accused him not only of impiety, but of opening the door of free-thinking in Italy; merely, it is said, because he recommended the works of Galileo, Grotius, and Newton.

His friends, however, powerfully supported him, and by the influence of Galvani, the director of the Neapolitan universities, he was appointed to the office of professor of ethics, which afforded him ample field for combating the ignorance and prejudices of the schools. The principle of his system was, that the happiness of man is the only object of the philosophical doctrine of morals, and he deduced his duties from analytical considerations. He interwove in his lectures the history of the human passions, and enlivened them by a boldness and spirit peculiarly his own. He composed a new system of logic, which he dictated in his lectures, and which was afterwards published in 1745, under the title of "Elementorum Arts Logico-criticae, Libri quinque." This might be considered as an introduction to his metaphysics, the first part of which had been published before this period, but the second and third parts made their appearance in the years 1747—1751. In 1748, he put up for the vacant chair of theology, but, as this was always connected with the episcopal dignity, he was immediately regarded as unfit for so high an office in the church, on account of his heretical notions. His enemies now discovered the most serious and alarming doctrines, in the published and unpublished pieces of which he had been the author. He was obliged therefore to renounce the science of theology, and to suppress some works on this subject. He now turned his attention to political economy, and in a few years he not only made himself master of every thing differing of notice on this science, but struck out some new lights. He published, in 1753, the first fruits of his researches, entitled "Essays on Agriculture, with considerations on the true Object of the Sciences." He was now, at the instance of his friend Intieri, made professor of political economy, with a considerable salary. The office had been conferred solely for him, and it was agreed that the lectures should always be delivered in the Italian language, a circumstance, at that time, which was unknown at Naples. His lecture room was crowded, and in a short space of time he was obliged to take a still larger place for the display of his talents, which also was insufficient to contain all who came to be benefited by his instructions. His chief and avowed object was, while he taught the principles of political economy, to inspire the Neapolitan youth with the social and civil virtues, and above all with a public spirit of patriotism, which was then almost unknown in Italy, and which he hoped to create in that nation, by which the prosperity of which it was susceptible. He caused to be translated Carey's History of the English Trade into the Italian, and then published it with useful notes. After this he pointed out in a short treatise the cause of the decline and neglect of agriculture in the kingdom of Naples. In 1765 he published another work, in which he examined the question, "Why countries, the most fruitful by nature, are often exposed to the miseries of scarcity." He was also author of many other works, but his master-piece was the "Italian System of Morality," of which the first part was published in the year 1767, under the title of "Discourses." His health now gave way, and he was unable to prosecute his studies, and, in 1768, he was obliged to discontinue his lectures, and in the following year he expired, in the fifty-seventh year of his age. He had attained, as a man of science, a very high reputation, and his moral character was in every respect worthy of a true philosopher. He possessed a most adorable love of truth, and a desire to extend its dominion, in which he was aware the happiness of his fellow-creatures was deeply concerned. "He was," says his biographer, "an irreconcilable enemy to injustice and deception; his countenance displayed cheerfulness, tranquillity, and invincible courage. He was too proud to flatter in order to become rich, and was contented with a very moderate income." He died poor, and would have been in dittered circumstances in the latter years of his life, had not the sovereign supported him unfailingly. He was held in high estimation by pope Benedict XIV. and many of the cardinals; and by infusing in the breasts of his pupils an ardent love of their country, with a well regulated zeal for
its chief interests, he was the means of introducing them to offices of distinction, which they filled with honour to themselves, and high advantage to the chief interests of the state.

Gen. Bisog.

GENOUILLAT, in Geography, a town of France, in the department of the Creuse; nine miles W. of Boufiaç.

GENOUILLE, a town of France, in the department of the Charente; 10 miles W. of Jean d'Angely.

GENOWI, a town of Africa; six miles N. of Sennaar.

GENASC, a town of France, in the department of the Gironde; nine miles S. E. of Libourne.

GENS D'ARMES. See Gendarmes.

GENERIC, in Biography, a famous king of the Vandals, succeeded his brother Gonderic in his Spanish dominions in the year 428. He had already signallized his courage and skill in war, and was entered to toil and hardships of every kind. Soon after his succession he invaded Africa, at the head of 50,000 men, and made himself master of the greater part of the country on the sea-coast. The persecution of the Donatists was an event highly favourable to the designs of Generic. Seventeen years before he had landed in Africa, a public conference was held at Carthage by order of the magistrates, which ended in a most severe persecution. Under these circumstances, Generic, himself a Christian, but an enemy of the orthodox faith, avowed himself the vindicator of the rights of the Donatists, who, in their turn, looked up to him as their deliverer, from whom they might reasonably expect the repeal of the odious and oppressive edicts of the Roman emperors. Generic obtained the most signal victories over his enemies, but notwithstanding his success, he agreed to a treaty with the emperor Valentinian, whom he consented to leave in possession of the three Mauritanias. He delivered to the Romans his own son Huneric, as a hostage for the observance of his treaty; but they, trusting to his good faith, sent back the youth. Generic abated this indulgence by feizing upon the city of Carthage in 439, at a time when the empire was engaged in a war with the Goths. From Carthage he sailed with a large fleet, and landed in Sicily. He ravaged almost the whole of that island, and made a valet bootty, but was unable to effect the conquest of Palermo. The object of this prince was to render himself formidable by sea; and he succeeded so completely, that the eastern and western emperors, Theodosius and Valentinian, thought it necessary to join against him. They fitted out a powerful fleet, with a large army, destined for the recovery of Africa, but Generic deluded them by proposals of accommodation, and the irruption of the Huns obliged Theodosius to recall his forces. When Maximus ascended the western throne, he compelled Eudoxia, the widow of Valentinian III., to marry him; she in a short time secretly applied for the dangerous aid of Generic to free her from his tyranny. He, feizing the occasion, appeared at the mouth of the Tiber with a numerous fleet; and in the conflict Maximus was slain, which afforded Generic an opportunity of marching to the gates of Rome, where he was admitted almost without opposition. For fourteen days the city was abandoned to all the licentiousness of a barbarian multitude; and on his return he carried away an immense quantity of treasure, besides multitudes of captivest, chiefly of the female sex, among whom were the empress and her two daughters, one of whom he married to his son Huneric; and after the lapse of several years, he restored the other and her mother to their native place. Generic continued to annex to his dominion the remaining Roman provinces in Africa; and then sent a fleet, consisting of sixty galleys, into the Italian sea, which was destroyed. But the loss of his ships did not prevent him from renewing his ravages on the coast of Italy, till his power received a severe check from the emperor Majorian, who now began to act on the offensive, and formed the spirited resolution of attacking the Vandals, in Africa. He fitted out a formidable fleet with the purpose, which obliged Generic to sue for peace. His suit being rejected, he sent out a squadron, which coming unawares upon the Roman navy, in the bay of Carthage, almost destroyed it. Peace was now made between the two warriors, the terms of which were observed till the death of Majorian, in 461. After this, Generic prepared to repeat his aggressions, and he again ravaged the coasts of Italy and Sicily, and even took possession of Sardinia. He extended his hostilities to all parts of the Mediterranean, and frequently indulged in acts of the most brutal atrocity. At one time he is reported to have massacred five hundred noble citizens of Zaccynthius, and to have thrown their dead bodies into the sea. Leo, the eastern emperor, resolved to make an effort to free his dominions from this terrible scourge, and made vain preparations for the invasion of Africa. The conduct of the expedition was given to Basiliscus, who might have exhorted for ever the kingdom of the Vandals, had he freed the moment of confirmation, and boldly advanced to the capital. Generic beheld the danger with firmness, and engaged it with his veteran dexterity. He professed himself ready to submit his person and dominions to the will of the emperor; but requested a truce of five days to regulate the terms of his submission. Basiliscus conferred to the fatal truce; and during the short interval, the wind became favourable to the designs of Generic. He manned his largest ships of war with the bravest of the Vandals and Moors; and they towed after them many large barges filled with combustible materials. In the obscurity of the night these destructive vessels were impelled against the unguarded and unsuspecting fleet of the Romans, who were soon awakened to a sense of their infant danger. "Their close and crowded order," says the historian, "afflicted the progress of the fire, which was communicated with rapid and irresistible violence; and the noise of the wind, the crackling of the flames, the dilluent cries of the soldiers and mariners, who could neither command, nor obey, increased the horror of the nocturnal tumult." Basiliscus returned ignominiously to Constantinople with the remainder of his shattered fleet; and thus the fruits of all this mighty effort were lost. Generic put to sea, recovered Sardinia, which had been taken from him, reduced Sicily and all the islands between Italy and Africa, and became a greater terror to the empire than ever. In 476, he made a peace with Odoacer, king of Italy, to whom he restored Sicily, but on condition of receiving tribute. The emperor Zeno likewise relinquished to him and his successors all claims to the African provinces. Generic died in the year 477. In his early youth he had renounced the orthodox communion; and as an apostate he could neither grant nor expect a sincere forgiveness. He was exasperated to find that the Africans, who had fled before him in the field, still presumed to dispute his will in synods and churches; and his ferocious mind was incapable of fear, or of compassion. His catholick subjects he oppressed with intolerant laws and arbitrary punishments. The language of Generic was various and formidable; the knowledge of his intentions might justify the most unfavourable interpretation of his actions; and the
the Arians were reproached with the frequent turbidities which stained the palace, and the dominions of the tyrant, Gibbon. Univer. Hist.

GENTIANA, in Geography, a town of Aicia, in the country of Alans; 370 miles E. of Patna. N. lat. 25° 10'. E. long. 92° 10'.

GENTIANA, in Gardening, the common name of a large hardy perennial herbaceous plant, which has a root that affords an extremely strong bitter. See GENTIANA.

GENTIANA, in Botany, varietum of the Greeks, named after Gentius, a king of Illyria, who is said to have discovered it, or at least to have first experienced its virtues as a cure for the plague, which infected his army. Gentian, or Fellwort. The latter name, we presume, is derived from fel, gall, alluding to its extreme bitterness, and not from fell, the north-country appellation of a mountain. It therefore ought to be, as Gerarde writes it, Fell-wort.—Linn. Gen. 126. Schreb. 175. Willd. Sp. Pl. v. t. 1331. Mart. Mill. Dict. v. 2. Sm. Fl. Brit. 284. Juss. 141. Larmor. Illutr. t. 199. Gertr. t. 114. Clas. and order, Pentandria Digynia. (Monogynia; Larmor.) Nat. Ord. Rosaceae. Linn. Gentiana, Juss.

Gen. Ch. Cal. Perianth inferior, in five deep, oblong, acute, permanent segments. Cor. of one petal, tubular in the lower part, without pores; in the upper five-cleft, regular, various in form and direction, withering. Stamina five, awl-shaped, shorter than the corolla, connected with its tube; anthers oblong, simple, sometimes united into a cylinder. P. G. Germanus inferior, ovate or oblong-cylindrical, as long as the flaments; styles none; filaments two, ovate, recurved. Peric. Capsule oblong, rounded, pointed, slightly cloven at the summit, of one cell and two concave inclosed valves. Seeds numerous, small, flatish. Receptacles two, affixed longitudinally to each valve.

Eff. Ch. Corolla tubaral at the base, delilute of neeta-

riberous pores. Capsule superior, of one cell and two valves, with many seeds.

Obf. The figure of the fruit is conical, but the corolla is very different in various species, being either wheel-shaped, bell-shaped, or funnel-shaped. In some there are small intermediate segments, in others a fringe to the corolla is given. It is plaited, in others plain. A few species have a four-cleft tetradalous flower; but the remark in Linn. Gen. 176, that there is a species with three additional parts of the flower, alludes to Clhora, once reckoned a Gentiana. Linnaeus has erased the line from his own copy, and his editors might easily have made the fame correction. G. lutea, and some others, however, have frequently a superabundance of divitions and flaments in a few of their blossoms.—The upper part of the germin so much resembles a style, that Larmor has perhaps offered no great violence to nature, or the Linnean fylinem, in considering it such.

This very noble and beautiful genus of herbaceous plants is chiefly of alpine origin, where the lovely blue flowers of many species enamel the turf in a most splendid manner. Most are perennial, some few annual. All are intensely bitter in flavor, especially the roots of the larger perennial kinds, G. lutea, Woodv. Med. Bot. t. 156, which is the official Gentian; purpurca, Fl. Dan. t. 50, which is the Curfita of the Edinburgh Pharmacopoeia; pannonica, Jacq. Aurtr. t. 136; pumilata, ibid. app. t. 28; and campurpula, t. 29. These are scarcely ever seen in gardens, except the first, which is not easily established; but few plants are more flately and ornamental. The North American G. sepa-

nica, Curt. Mag. t. 1039; and the alpine aqebidenta, t. 1578, are both very handsome, and we have found the latter thrive for many years in a bed of peat, earth and loam, as well as on its native mountains. See Curt. Mag.—G. acutula, Curt. Mag. t. 52. Eng. Bot. t. 1504, is one of the most common in gardens, but requires rather a pure air. G. ferru-

na, closely allied to it in habit and beauty, see Eng. Bot. t. 453, though wild in the mountainous parts of Durham, and abundant on the Swiss and Italian Alps, will scarcely live in a garden at all. G. Pseudomaranta, ibid. t. 20, found on turfy heaths in many places, is likewise very handsome, and rather impatient of culture. We have never seen the culture of the annual kinds attempted; such are niveas, Eng. Bot. t. 896; Amarella, t. 236; and campurpula, t. 237.

Linmeus was by no means well acquainted with the different species of this genus, having never visited the more southern Alps of Europe, where alone they are to be studied to advantage. Hence his varia and noronica are one species, and he confounded with lutec, which he seems never to have seen, or at least to have afterwards forgotten, the G. florib-

bus terminatus diaphanus, Gmel. Sib. v. 4. 160; G. alpige, Pallas. Rof. t. 95. Hence the erroneous remark under lutec, "petala puncta farpa cereberrima, flava." There is some doubt whether G. sepurnida, Sims in Curt. Mag. t. 1229, be the same as Pallas's t. 92. f. 3. In the former the flower appears to us very rarely, if ever, with more than five divisions, nor do the habits of the two figures accord. Willdenow has fifty-fix species of Gentiana, some of which among the annual kinds we are not able to determine to our satisfaction. He quotes a monograph by Froelich, which appears to have great merit, but which has not come to our hands.—Six species only of this genus are wild in Britain, the Clhora and Chiroria being now, with the greatest possible propriety, separated from it.

GENTIANA, in Gardening, comprises plants of the hardy, herbaceous, perennial, flowery kind; of which the species cultivated are the yellow gentian (G. lutec); spotted flower-

ed gentian (G. punctata); swallow-wort-leaved gentian (G. nuladiata); and the dwarf gentian, or gentianella.

Method of Culture.—In the three first sorts it is easily es-

saced by laying the seeds in pots soon after it is ripe, as when kept till spring it will not succeed; the pots should be placed in a shady situation, and kept clean from weeds. Some advise their being kept in a greenhouse, which is not bad; but the best is probably the last method. In the springing the plants appear, when they must be duly watered in dry weather, and kept clean from weeds till the following autumn; then be carefully shaken out of the pots, so as not to break or injure their roots; and a shady border of loamy earth should be well dug and prepared to receive them, into which they should be put at about six inches distance each way, the tops of the roots being kept a little below the surface of the ground, and the earth profiled close to the roots. If the fol-

lowing spring prove dry, they should be duly watered to forward their growth. The plants may remain here two years, by which time they will be fit to transplant where they are designed to grow, removing them in the autumn as soon as their leaves decay; great care being taken in digging them up not to cut or break their roots, as that greatly weakens them. They require afterwards another culture but to dig the ground about them early in the spring before they begin to flower, and in the summer to keep them clean from weeds. The roots continue many years, but the Falks decay every autumn;
the same roots not flowering two years together, or seldom oftener than every third. When they flower strongly, they have, however, a fine appearance among other similar plants.

In respect to the last it is mostly propagated by offsets or parting the roots, and planting them where they are to remain in the early autumn; but in order to have the plants flower well, they should not be often transplanted or parted. And they are also capable of being raised from seeds managed in the same way as in the first kinds.

All these plants succeed the most perfectly in moist loamy soils, where there is a degree of shade afforded. They are useful as ornamental plants, for the clumps, borders, and quarters of pleasure-grounds; those of low growth being planted towards the fronts, and the latter kinds more backward in them.

GENTIAN, Gentiana, in the Materia Medica. The root, which is the only medicinal part of the plant, has little or no balsam, but to the taste it manifests great bitterness; a quality which is extracted by aquae, spirituous, and vinous menstrua, though not in so great a degree by water as by spirit; and the extract of this root, prepared from the watery infusion, is left bitter than that made from the spirituous tincture. Gentian is the principal bitter now employed by physicians; and as the intense bitters are generally admitted to be not only tonic and homoeopathic, but also antiseptic, antispasmodic, antihypertensive, and diuretic, this root has a better claim to the possession of these powers than most of this kind. Many dyspeptic complaints, though arising from acidity of the stomach, are more effectually relieved by bitters than by Peruvian bark; and hence may be inferred their superior tonic power on the organs of digestion; but we are told by Dr. Cullen (Mat. Med. vol. ii.) that the gentian, joined with equal parts of tormentil or galls, considerably succeeded in curing intermittent fevers, if given in sufficient quantity. As a simple bitter the gentian is rendered more grateful to the stomach by the addition of an aromatic; and for this purpose orange-peel is commonly employed. The official preparations of this root are, the "infusum gentianae compostitum," and "tinctura gentianae compostis," (Ph. Lond.) and the "infusum amarum," "vinum amarum," "tinctura amara," five "elixir flammacum" (Ph. Ed.) which latter is made by Dr. Cullen to be the same as Stoughton's elixir, (see Stoughton's Elixir) and by both Pharmacopoeia the extract is directed. The "compound infusion" is prepared by taking gentian root sliced and orange-peel dried, of each a dram, of fresh lemon-peel two grains, and boiling water twelve ounces; and macerating for an hour in a covered vessel, and then straining the liquor. For the "tincture," take of gentian root dried, two ounces, orange-peel dried, an ounce, cardamom seeds bruised, half an ounce, and proof spirit two drachms; macerate for fourteen days, and strain. For the "extract," take of gentian-root sliced, a pound, and boiling water, a gallon; macerate for twenty-four hours, then boil down to four pints; strain the hot liquor, and evaporate it to a proper consistence. The extracts are made into pills, with or without aromatic additions. Wines and mulled liquors are likewise prepared with the virtues of this root in different proportions. An ounce of the gentian root, the same quantity of fresh lemon-peel, and two drams of long pepper, communicate by maceration, without heat, a grateful warmth and bitterness to a quart of mountain. There is an Indian gentian brought from America by the Portuguese, of a pale yellowish colour, jointed and marked with knots and circles like ipomea, and more intensely bitter than any of the officinal bitter drugs. This root is greatly commended in obstinate intermitents, and other disorders; a scruple is said to be more effectual than repeated half doses of bark.

There was a mixture of henbane root brought over some years ago with the common gentian, which occasioned violent disorders, and in some instances proved fatal.

This root is of a paler colour than gentian, and its longitudinal wrinkles finer and closer; the poisonous root, when cut, appears white, without any degree of the yellow hue, which is deep in gentian; and its taste is not bitter, but mucilaginous. Phil. Trans. vol. xlvi. p. 250. Lewis's Med. Cold. Woodville's Mat. Med.

GENTIAN Water. See Water.

GENTIANAE, the forty-fifth natural order of plants in Jullien's family, or the thirteenth of his eighth clads, so named from the principal genus contained in it. The characters of this eighth clads is Cotyledons two. Flowers of one petal, inferted below the germen, regular or irregular. Ca- tyleon of one leaf. Stamen of a definite number, inserted into the corolla, and usually alternate with its divisions, when they agree in number. Gernn superior, simple; style one, (sometimes none in the Apices, with a double germen); stigma simple or divided. Fruits one, or two, containing either one or two seeds, or for the most part enclosed, either in a pulpy or a capsular feed-veil, of one or many cells.

The characters of the Gentiana are these. Calyx divided, permanent. Corolla regular, often withering before it falls, with a limb equally divided, whose segments agree in number with those of the calyx and are mostly commonly five, sometimes oblique. Stamens as many, inserted into the middle or upper part of the corolla; anthers incumbent. Style one, or rarely, by splitting, double; stigma simple or lobed. Capsules simple or of two parts, of two valves, and one or two cells, the valves inflexed at the margin, involute where there is but one cell, flat and confining the portion where there are two. Seeds numerous, small, inferted into a marginal receptacle connected with the valves. Stem herbaeous, rarely somewhat thorny. Leaves opposite, mostly undivided and sessile; floral ones occasionally smaller, resembling bracteas, the flowers in such case becoming, as it were, doubly bracteate. — The first section has a simple capsule, of one cell, and contains Gentiana, Lili of Schreber (Vatleia of A. Sol.) Pedatum of Schreber (Gentiana of Aublet), Scardata and Chlora; the second, with a simple capsule of two cells, contains Exacum, Lithanthus, Myrrzia of Schreber (Tackia of Aublet), Gloriosa and Nigrina; the third with a didymous or two-lobed capsule of two cells, contains only Spigelia and Ophiophriza. In a fourth section stands as the kind to this order, by itself, Nicaudae of Schreber (Petalis of Aublet.) The plants of this natural order are chiefly remarkable for their intense bitternesses, and consequent florimachic virtues. Their flowers are usually beautiful, either blue, yellow or red, rarely white, except by occasional variation of the blue or red.

GENTIANELLA, in Gardening, the common name of the dwarf gentian, and which properly signifies the little gentian, which has a broad leaf and large flower. See Gentia- na.

GENTILE, Gentile, a pagan, or person who adores false gods. The Hebrews applied the name [נוכי], geres, nations, to all the people of the earth who were not Israelites or Hebrews.

Some will have it that the gentiles were thus called in contradiction to the Jews, because the latter had a positive law
The law to observe in matters of religion, whereas the gentiles had only the natural law: hence they are called "gentiles, quin sunt uti gentii fuerunt," because they remain as in a state of nature.

The Jews apply the denomination gentiles much as the Christians do that of infidels. St. Paul is called the δικαιος, or απολυμανος of the gentiles, which appellation he first gave himself; Rom. xi. 13. "As I am the apostle of the gentiles, I magnify mine office."

The calling of the gentiles to Christianity had been predicted in the Old Testament, as it was accomplished in the New. See Psa. ii. 8. lxi. ii. Joel ii. 29. Matt. viii. 12. xii. 18. Acts. xi. 18. xiii. 47. 48. xxviii. 28. Rom. i. 5. iii. 29. xii. 13. 25. Eph. ii. 11. Rev. xi. 2. xiiii. 2.

Some account may not be improperly given in this place of the state of Christianity both before and after the time of Constantine's conversion. The opposition of the Jews to its reception and prevalence appears in the Acts of the Apostles, and the epistles of the New Testament. Our present object is to consider, first, the state of its progress in gentile countries, and under heathen emperors, from about the middle of the first century, when it began to be preached among the gentiles, and to make some progress among them, to the period when Constantine embraced the Christian religion; and, secondly, its state under the Christian emperors, and their treatment by the gentiles. In the former period, we find from St. Luke's account in the Acts of the Apostles (ch. xiv. 19, 20. ch. xvi. 19-24.) that St. Paul met with some difficulties in preaching the gospel in gentile cities: but no imperial edicts were issued against the Christians, before that of Nero in the year of Christ 64 or 65, at which time the two apostles, Peter and John, were put to death. For an account of the ten persecutions, as they have been usually reckoned, which the Christians suffered under heathen emperors, we refer to the article Persecution. These persecutions were ordered by edicts of emperors, beginning with Nero's and ending with Diocletian's. During the whole of this period Christianity had been in a state of persecution. At the commencement of the second period, in 313, Constantine and Licinius issued a law or edict, giving liberty to all men, Christians and others, to follow that way of worship which should be most agreeable to them. However, it appears that Constantine did not strictly observe his own edict; for, according to the utmost of his power, by various methods, by laws, institutions, rewards and encouragements, he endeavoured to root out the ancient religion, and to promote the Christian doctrine. Conceiving that neither he nor the Roman empire could be safe, as long as the ancient superstition subsisted, he openly opposed the gods of the gentiles, and their worship, as dangerous to the public welfare. After the death of Constantine in the year 337, the whole empire was divided between his sons, Constan- tius, with whom his brother Constantine remained, was put under suspicion of perjury to cease, and the madness of sacrificing to be abolished; under the menace of a proper and convenient punishment. This law was followed by another law of Constantius in the next year, 332, forbidding the demolition of temples, which flourished without the walls of the city of Rome. Another law, which was the first of Constantius, and passed, as it has been supposed, in the year 335, ordained that in all places, and in all cities, temples should be immediately shut up, and that the people should abstain from sacrifices, under the penalty of death and the confiscation of their estates to the treasury. The second law of Constan- tius, in the same year, prohibited nocturnal sacrifices; and a law, published by the same emperor in the year 336, appointed capital punishment to such as were convicted of per- forming sacrifices or worshipping images. Three other laws of Constantius were also published in the year 356 or 357, with the penalty of death against all who consulted any of the ministers of divination, who are enumerated under their several titles of haruspices, mathematicians, Chaldeans, la- rioloi, augurs, vates, and magicians. The emperor Julian is well known for his zeal in favour of gentilism, and for his injurious treatment of the Christians. At his accession we may reasonably suppose, that all the laws of preceding Christian emperors against gentilism and its rites, were abrogated, and that it was actually established by imperial edicts; whilst the Christians were deprived of magistracy, and all honours and dignities as well as all of equal rights of citizenship. The emperors Jovian, Valentinian, and Valens were Christians; and they encouraged their subjects in the profusion of Chri- stianity, and protected them in the enjoyment of the privi- leges conferred upon them by Constantine: but it does not appear that during this period any new laws were issued against gentiles and their sacrifices. Jovian, indeed, pub- lished a law of universal toleration; and Valentinian was remarkable for the moderation of his government. In the year 381 was issued a law of Theodosius, with the joint authority of Gratian, and the younger Valentinian, enacting, that apostates from Chritianity to paganism should lose the power of making a will. This law was afterwards ratified, and followed by other laws of Theodosius the Great, Valen- tian the Younger, Arcadius, Honorius, and Theodosius II., with the addition of other clauses. In the same year, 381, and by the same authority, was enacted a law, for- bidding all sacrifices in the way of divination, either by day or by night, in the temples or elsewhere, upon the pain of proscription. By another law of Theodosius, in the following year, the magnificent temple in the province of Ofrhoenc, or Edesia, was allowed to be frequented, provided no sacrifices were performed there. In 385 Theodosius published another law, forbidding sacrifices, especially such as were made in the way of divination, and for discovering futurities, upon pain of death. In 391 was pub- lished a law of Theodosius, in which all sacrifices of inno- cent victims, and access to the temples, and the worship of false gods, were prohibited. This law was particularly designed for Rome and Italy; and in the same year a simi- lar law was published for Egypt, forbidding sacrifices and access to temples. In 392 was published a severe law of Theodosius, forbidding to men of all ranks every kind of heathenish worship; and in 399 Arcadius published a law for destroying temples in country places. Several other laws were published by Theodosius the younger against all Pagan obligations and sacrifices, and ordering the destruction of chapels, temples, and consecrated places. Nevertheless gentilism still subsisted. Upon the whole it may be observed, that the period of 20 or 25 years, from the death of Con- stantine to the accession of Theodosius, or thereabout, is remarkable for the mildness of law, which the gentiles were treated, and the few laws that were issued against them; and these laws against gentilism were not rigorously executed; but many gentiles were admitted into civil offices of great trust and profit; and many influences occur, which enshrine the mons- tration of Christian magistrates under Christian emperors; and, indeed, it is true both with respect to Christians and gentiles, that all wise and understanding men, of every sect and religion, recommended moderation, and concurred in condemning force and compulsion in religious matters. See more on this subject in Lardner's Works, vol. ix. 98-218.

Gentile, Gentilis, in the Roman Law and History, a name which sometimes expresses those whom the Romans otherwise call Barbarians; whether they were aliens of Rome,
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or not. In which sense the word occurs in Ammianus, Antonius, and the Notitia Imperii.

Gentilis was also used, in a more peculiar sense, for all strangers, or foreigners, not subject to the Roman empire; as we see in the Theodosian Code, in the title of "De Nuptiis Gentilium;" where the word gentiles stands opposed to provinciales, or the inhabitants of the provinces of the empire.

The word is likewise used, in this sense, in the Greek; but it was not introduced either into that, or the Latin tongue, till after Christianity was established; it being taken from scripture. See Esquire and Gentleman.

Gentileschi, Orazio, in Biography, a painter, born at Pisa in 1563. His parental name was Lomi; but he chose to adopt that of his maternal uncle. He first learnt the art under his half brother Aurelio Lomi, but afterwards studied at Rome. After distinguishing himself at Florence, Turin, and Genoa, he passed to Savoy and France, and thence was invited into England by Charles I. who gave him lodgings, and a considerable salary; and employed him in painting ceilings, &c. at Greenwich. He was also employed by Villiers, duke of Buckingham, at York House, on a picture of himself and his family. After residing here about twelve years, he died at the age of 84 in 1647. The cleverness and brilliancy of the style in which he painted may be seen to the greatest perfection in a picture at Hampton Court of Joseph and Potiphar's wife. He made king Charles a present of a large book of drawings, and was deservedly respected and admired for his abilities.

Gentileschi, Artemisia, daughter of Orazio, and his pupil, who obtained almost as much skill and credit as her father. She followed him to England, where she practised in portraits with great success. She also exercised her talents in historical painting, and has left many highly creditable works behind her.

Her picture of Judith with the head of Holofernes at St. James's palace, is in the same style of design as her father's, but though very skilful, is not so bright, or so finely wrought as his pictures usually are. After the death of Orazio, she retired to Naples, where Graham says she became as famous for her amours as for her skill in painting. She died in 1642.

Gentilis, Alberico, was born in 1550, at Castel S. Giovanni, in the marche of Ancona. He studied the law, and took his degrees at the university of Perugia, and was priest at Ascoli, when his father, becoming a convert to the reformed religion, determined to quit Italy, and take with him his son Alberico and Scipio. The former, the subject of this article, came to England, and in 1582 was chosen professor of jurisprudence in the university of Oxford, which he held with much reputation till his death in 1608. He was a man of great learning, and published various works. One, entitled "Six Dialogues on the Interpreters of Law," he dedicated to his patron the earl of Leicester. He is author of three books "De Jure belli," which are highly applauded by Grotius; of three others "De Legationibus," and several tracts relative to antiquities. His "Lectiones Virgiliana" prove that he had cultivated polite literature very successfully.

Gentilis, Scipio, brother of the preceding, was born in 1563, and, while a child, was sent to Tübingen for his education. He here distinguished himself in the study of the classics and jurisprudence, which he afterwards pursued with inebriating success at the universities of Wittemberg and Leyden. In 1589 he took his degree of doctor at Bafl, and then went to Wittemberg as a public expounder of the law. Shortly after he removed to Aldorf, and became principal professor of law. His fame extended very far, and he received invitations to settle at several universities, and one from pope Clement VIII. to settle at Bologna, which he declined. He died at Aldorf in 1616, leaving behind him many works as monuments of his deep erudition. These were afterwards collected and printed in 8 vols. 4to.; they are chiefly on subjects connected with jurisprudence. As a teacher, his manner was clear and interesting. He was a good Latin poet, and translated several of the Psalms, and the first two cantos of Tasso's Jerusalem. Bayle.

Gentilis, Gentiles, was born at Foligni, in Italy, about the year 1530. He studied medicine under the tuition of Thiaddeus of Florence, with great diligence and reputation, so that on his return to his native place he was regarded by his fellow-citizens as the first physician of the time; and his fame soon extended through Italy. He was also esteemed one of the best commentators upon Avicenna, whose writings were then held in high veneration in most of the universities of Europe. Gentilis died at Bologna about the year 1590. He published several treatises, which were collected and published at Venice, in four volumes folio, in 1584, 1586, and 1592. The following works were likewise printed separately: 1. "Expositio in De Avcicenna."—2. "De Fideibus," Venice, 1482—5. "Expositio cum Commento Avidgi Monachi Benediclini Libri de Judiciis Unrinarum, et Libri de Pulpibus." Ibid. 1494—6. "Confusis peregrinatu quies morborum totius corporis generis," with some other tracts, Venice, 1593—5. "Quaestiones et Traetatus extravagantes." Ibid. 1520—9. "De Lepra Traetatus." Ibid. 1536, with the surgery of Dinos de Garbo. 7. "De proportionibus Medicinorum," with different dissertations upon the subject of doses of medicines by the most celebrated physicians, Padua 1556, &c. See Elyot. Dict. His.-Several other individuals of the family of Gentilis were distinguished for their knowledge of medicine and the sciences.

Gentilis, John-Valentine, was born at Cofenza in Calabria. Educated in the principles of the Roman Catholic religion, and becoming a convert to the principles of the Reformation, he was obliged to quit his native country, and take refuge in Geneva, where several Italian families had already formed a congregation. His enquiries did not stop by the open renunciation of papal errors; he became diffusified with the orthodox doctrine of the Trinity. He was required to subscribe to the articles of faith which the persecutor John Calvin had established against here, to which a promise was annexed, never to do any thing, directly or indirectly, that should controvert the doctrine of the Trinity. At first Gentilis refused the test, but was afterwards prevailed on to comply, dreading probably, in case of his resistance, a similar treatment to that which Servetus had experienced. What his hand had signed, and his tongue confessed, his heart abhorred, and in private he did not scruple to avow the truth, which coming to the ears of the magistrates, they committed him to prison. From the dungeon he attempted to escape, and fled with his persecutor, showing the insufficiency of his opinions, but their hearts were filled against the supplications of a heretic, till he offered to abjure his errors, consented to throw his writings into the fire, and take an oath not to quit Geneva without leave of the magistrates. Being thus, in a measure, freed from suspicion, and feeling conscious that he would be justified in breaking an oath which had been purged by terror, he withdrew from the city, but finding no place of safety he returned, was again imprisoned, but in a short time liberated. From this period he seems to have wandered from place to place, and we find him at Lyons, in various parts of Poland and Germany, in Savoy, and at laf
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at Bern, where he was accursed of hereby. He underwent a long and tedious trial, and being convicted of obliquely oppugning the mystery of the Trinity, he was sentenced to lose his head. This sentence was carried into execution, but death, which, at a greater distance, seemed so formidable to him, was now deferred of his terrors, and by a manly fortitude he was enabled to triumph over his enemies, who expected that his mind was ill-adapted to so trying a scene; his last moments were probably the happiest of his life. He died exulting that he was thought worthy of suffering for the cause of truth, and that he was admitted to seal, with his blood, the doctrine of the supremacy and unrivaled glory of the Father. Merer. Bayle.

GENTILITIA, SACRA, among the Romans. See SACRA.

GENTILITIUS, an epithet used by some authors to express different propagated from father to son, and running through whole families; such were more usually called hereditary disorders. Such are the gout very frequently, and often many others.

GENTILLET, VALENTINE, in Biographia, a native of Dauphiné, who flourished in the sixteenth century. He had in early life studied jurisprudence, and was a civilian by profession. He was an advocate in the parliament of Toulouf, and afterwards a syndic of the republic of Geneva, and at one period of his life he was president of the parliament of Grenoble. He became distinguished by his writings against popery, but by the edicts published in France against those of the reformed religion, he was driven into exile. His principal work is, "An Apology for the Protestants," which went through several editions in the French, and was afterwards translated into Latin and enlarged, under the title of "Apologia pro Christianis Gallis Religionis. Evangelicae feud Reformatae, qua doctur hujus Religionis fundamenta in Sacra Scriptura jacta effe:;" and "Le Bureau du Concile de Trente, &c." This was printed in French in 1586, and in the same year a Latin translation of it was published, which was frequently reprinted at different places. Its design is to show that many of the decrees of that council were contrary to the ancient councils and canons. He was author also of "Anti-machavel," and the "Anti-focioin." Bayle.

GENTIMANETOUR, in Geography, a town of Hindooftan, in the Carnatic; 30 miles W. of Cuddalore.

GENTILOUX et PALLIER, a town of France, in the department of the Creufe, and chief place of a canton in the district of Aubution; 9 miles S.W. of Tulle. The place contains 907, and the canton 6,527 inhabitants, on a territory of 3273' kilometres, in 8 communes.

GENTLE PET OR, in Mineralogy, a name given by our miners in Suffolk, to a kind of iron ore found in considerable plenty in that county, and very readily running in the fire, though not very rich in metal. It is a strong subfiance, and lies in several parts of that county in form of a moderately thick stratum. It is of a dully brown colour, and in some places much paler than in others. It has always a great number of glittering splangles in it, and very often contains foillie shells, and other extraneous subfances.

GENTLEMAN, a person of good family, or descended of a family which has long borne arms, the grant of which adds gentility to a man's family.

The word is formed of the French gentilhomme, or rather of gentil, fine, fashionable, or becoming; and the Saxon mon, q. d. beneplus, or honfio loco natur. The same signification has the Italian gentilhomme, and the Spanish heredez, or hijo-
dez, that is, the son of somebody, or of a person of note. If we go farther back, we shall find gentilhomme originally derived from the Latin gentilis homo, which was used among the Romans for a race of noble persons, of the same name, born of free or ingenuous parents, and whose ancestors had never been slaves, or put to death by law. Thus Cicero, in his Topics, "gentiles sunt, qui inter se eodem futinem non minu" ingenii oriund, quorum majorum nemo furt detriment furtivit, qui capitae non futinem, &c." Some hold that it was formed from gentile, i.e. person, and that the ancient Franks, who conquered Gaul, which was then converted to Chriftianity, were called gentiles by the natives, as being yet heathens. Others relate that towards the declension of the Roman empire, as recorded by Arnimianus Marcellinus, there were two companies of brave forders; the one called gentilium, and the other futoriarum; and that it was hence we derived the names gentleman and esquire. This sentiment is confirmed by Palquier, who supposes the appellation gentiles and esquires to have been transmitted to us from the Roman forders; it being to the gentiles and futori, who were the bravest of the forders, that the principal benefices and portions of lands were assigned. (See BENEFICE.)

The Gauls observing, that during the empire of the Romans, the futori and gentiles had the best tenements, or appointments of all the forders on the frontiers of the provinces, became insensibly accustomed to apply the fame names, gentilhommes, and esquire, to such as found their kings gave the best provisions or appointments to. Palef. Rech. lib. ii., cap. 15.

In strictness, Chamberlayne observes, a gentleman is one whose ancestors have been freemen, and have owed obedience to none but their prince; on which footing, no man can be a gentleman who is not born fo.

Among us, the term gentleman is applicable to all above yeomen; so that noblemen may be properly called gentlemen.

In our statutes, gentilis homo was adjudged a good addition for a gentleman, 27 Edw. III. The addition of knight is very ancient; but that of esquire, or gentleman, was rare. Before.

We read that J. Kingdon was made a gentleman by king: Richard II.

As it may justly be asked what constitutes a gentleman with us? the reply is easy; being a gentleman, is being entitled to bear arms. And Mr. Camden observes, that the distinction of a gentleman of coat-armour, or an uplar, and a gentleman of blood, is the bearing of arms from the grandfather; and that he who bears arms from his grandfather is to all intents and purposes a gentleman of blood; for which cause it is requisite by the statutes of the Bath that every knight, before his admission, proves himself to be so qualified, which done, it carries with it, if its merit be equal, a passport into the order of the Garter. Notitia Anglicana, p. 24. See also Dodridge's Honour's Pedigree, p. 147.

Smith, De Re Libr. Angl. & Fortefcue, fol. 82.

Guillum, in his chapter of gentlemen, says, that they have their beginning either of blood, as being born of worshipful parents; or that they have done something, either in peace or war, whereby they deserve to bear arms, and be acknowledged gentlemen. He further says, chap. xxiv., that a gentleman be bound apprenrice to a merchant or other trader, he hath not thereby lost his gentility; and he devises it may be remembered, for the honour of trade, that king Henry VIII. thought it no dishonour to him, when he quitted his queen, to take to his wife Anne, the daughter of Thomas Bolen, some time mayor of London. To which he may be added the thought, that the first William, who founded our royal race, was the grandson of a tanner.

Sir Edward Coke says, that esquires and gentlemen are only:
only names of worship, and not of dignity. And before thee the heralds rank all colonels, serjeants at law, and doctors in the three learned professions. See PRECEDENCE.

Sir Thomas Smith (ubi supra) says, that whatsoever studieth the laws of the realm, or studieth in the university, or professeth the liberal sciences; and (in short) who can live idly, and without manual labour, and will bear the port, charge, and countenance of a gentleman, shall be called master, and shall be taken for a gentleman.

GENTLEMAN Ulster of the Black Rod, is the chief gentleman usher to the king, called in the black book "Lator virgis nigris, et haitianus," and elsewhere "Virga bajuclus." His duty is to bear the rod before the king at the feast of St. George at Windsor; he has also the keeping of the chamber-house door, when a chapter of the order of the garter is sitting; and in time of parliament attends the house of peers. His badge is a "black rod," with a lion in gold at top. This rod has the authority of a mace; and to his custody all peers questioned for any crime are first committed.

GENTLEMAN of the Bed-chamber. See BED-CHAMBER.

GENTLEMEN of the Chapel, are officers whose duty and attendance are in the royal chapel, being in number thirty; ten whereof are priests, and the other twenty called clerks of the chapel, who assist in the performance of divine service. One of the first ten is chosen for confessors of the household, whose office it is to read prayers every morning to the household servants; to visit the sick, examine and prepare communicants, and administer the sacrament.

Another, well versed in music, is chosen first organist; who is master of the children, to instruct them in music, and what is necessary for the service of the chapel: a second is likewise an organist; a third a lutenist; and a fourth a violist.

There are likewise three vergers, so called from the silver rods they usually carry in their hands; being a serjeant, yeoman, and groom of the vestry: the first attends the dean and shuttle-dean; finds surplices and other necessaries for the chapel: the second has the whole care of the chapel; keeps the pews, and seats the nobility and gentry; the groom has his attendance within the chapel-door, and looks after it.

GENTLEMEN Pensioners. See PENSIONERS.

GENTLE, in Geography, a town of Germany, in the duchy of Magdeburg; 30 miles N.E. of Magdeburg.

GENTLEWOMAN, GENTLOGA, is a good addition for the estate and degree of a woman, as gentilicus is for that of a man; and if a gentlewoman be named spinster in any original writ, appeal, &c. it hath been held that she may abide, and quash the same. (2 Inst. 668.) But it seems that spinster is in general a good addition for an unmarried woman, as single woman is for one who, being unmarried, hath had a bastard.

GENTOOS, in Modern History, according to the common acceptance of the term, denote the professors of the religion of the Brahmins (see BRAMANS), who inhabit the country called Hindoostan, in the East Indies, from the word sian, a region, and hind or hindu; which Periplus, as we learn from colonel Dow's translation of his History, supposes to have been a son of Ham, the son of Noah. It is observed, however, that Hindoo is not the name by which the inhabitants originally dyed themselves, but according to the idiom of the Sanscrit, which they use, jambudvip, from jambu, a juckale, an animal common in their country, and dep, a large portion of land surrounded by the sea, or herakhain, from bhaut, i. e. a continent, and herai, the name of one of the first Indian kings. It is also observed, that they have assumed the name of Hindoos only since the era of the Tartar government, to distinguish themselves from their conquerors, the Mussulmen. The term Gentoos, or Gentoo, in the Sanscrit dialect, denotes animal in general, and in its more confined sense mankind, and is never appropriated particularly to such as follow the doctrines of Brahms. These are divided into four great tribes, each of which has its own separate appellation; but they have no common or collective term that comprehends the whole nation under the idea affixed by the Europeans to the word Gentoo. Mr. Halhead, in the preface to his translation of the "Code of Gentoo Laws," conjectures that the Portuguese on their first arrival in India, hearing the word frequently in the mouths of the natives, as applied to mankind in general, might adopt it for the domestic appellation of the Indians themselves, or, perhaps, their bigotry might force from the word Gentoo a fanciful allusion to gentle or pagan. The Hindoos, or Gentooos, vie with the Chinese as to the antiquity of their nation. They reckon the duration of the world by four ages, or distinct periods; for the first is the Sutter, or age of purity, which is said to have lasted about 3,250,000 years, during which the life of man was 100,000 years, and his stature twenty-one cubits; the second, the Thirtah jogue, or the age in which one-third of mankind were reprobrate, which continued 2,400,000 years, when men lived to the age of 10,000 years; the third, the Dwapar jogue, in which half the human race became depraved, which endured to 60,000 years, when men's lives were reduced to 1,000 years; and fourthly, the Collee jogue, in which all mankind were corrupted, or rather diminished, which word colle imports. This is the present era, which they suppose will subdue for 40,000 years, of which near 5,000 are already past, and man's life in this period is limited to 100 years. It is supported by many authors, that most of the Gentoo jesters or scripturites, were composed about the beginning of the collee jogue or cal jug, of which, according to Mr. Dow, the year of Christ 1769 was the 488th; but an objection occurs against this supposition, viz. that the flavers take no notice of the deluge; to which the Bramins reply, that all the scripturites were written before the deluge, and the deluge never extended to Hindoostan. Nevertheless, it appears from the flasters themselves, that they claim a much higher antiquity than this; instances of which are cited by Mr. Halhead.

After all, it must be allowed, that persons of sagacity and good judgment have made it appear with sufficient evidence, that the oldest accounts of the Hindoo nation do not, in reality, go further back than to the deluge mentioned in the books of Moses, and that their religious institutions were consequentially posterior to that event. Sir William Jones says, (Discourses relating to Asia, vol. i. p. 195,) that the first corruption of the purest and oldest religion, which consisted in the worship of one God, the maker and governor of all things, was the fyllem of the Indian theology, invented by the Brahms, and prevailing in those territories, where the book of Mahabob, or Menu, is at this time the Standard of all religious and moral duties. In his preface to the "Institutions of Menu," (see Menu) he says, they are supposed by the Brahms to have been originated by Menu, the son of standard of Brahms, or the first of created beings. This work he supposes to have been written about 2500 years after the Vedas, or about 1280 years B. C. Sir W. Jones is of opinion, that the origin of the Hindoo nation and government is to be looked for in Iran, or Persia, where a great monarchy was established before the Aryanian, called by the oriental historians the "Pithodian dynasty;" and they say, that
that the first of these ancient monarchs, whom they call Mahabad, or Menu, received from the creator a sacred book, in a heavenly language, meaning the "Vedas." (Diff. relating to Aia, vol. ii. p. 111.) This first monarch, they also say, divided the people into four orders, the religious, the military, the commercial, and the servile. (Diff. &c. vol. i. p. 197. 206.) In the reign of Hulhang, the third of the Phidadiad race, a reformation, he says, was made in the religious system, when the complex polytheism of the preceding times was rejected, and religion was reduced to what is called "Sabaiwm," which consisted chiefly in the worship of the sun, moon, and stars; but it is probable, that fabâim, being a more simple form of religion than that of the Hindoos, must have preceded it. The laws of Mahabad, however, were retained, and their superstitious veneration for fire. Upon this change, the favourers of the old religion retired to Hindoostan, and their oldest existing laws forbade them ever to return, or to leave the country they now inhabit.

Another reformation, or change in the system, was made, he says, under Guhaftap, in the next, or (2) "Hindoo," dynasty, thought to have been the same with Durias Hyfalsn. This was effected by Zeratthu, or Zoroaster; he introduced genii, or angels, predestined over months and days, new ceremonies in the veneration shown to fire, and gave out a new work, which he said came from heaven, but at the same time established the adoration of the Supreme Being. This work was loft at the conquest of Persia by the Mahometans; but the priests of that religion have composed another from what they were able to recollect of their institution. It is called "Zendbrijia," which fee. The followers of Zeratthu, now called "Gehres," or Parâis, perverted those of the religion immediately preceding; and this also took refuge in India, where they wrote a number of books, which are now very scarce. They resemble, according to the account of Sir William Jones, the Hindoo sects of "Sauras," and "Sagunias," of which the latter is very numerous at Benares.

Another innovator in the religion of the Ealr, before the Christian era, was "Buddha," (see Boopri), generally supposed to have been the same with Po or (3) "Buddha," the "Sonomocomor of Shitam, the "Xena," of Japan, and the "Odia" of the north of Europe. According to Sir W. Jones, he disapproved of the Vedas, because they enjoined the sacrifice of cattle; and made his appearance in the year 1057 B.C. His disciples are thought to have been the same with the "Sammânes," who were opposed to the Brahmanes of the Greek historians. But thes Sammanes were, it is probable, of much greater antiquity, as was also Somonocomor. The followers of Buddha gave great umbrage to the Brahminks, who never ceased to persecute them till they had effected their expatriation from Hindoostan by fire and sword, about 500 years ago. There is, however, a great resemblance between the system of the Hindoos and that of Buddha; and perhaps with a view to conciliate these people, the Brahmins of Càfô make Buddha the 9th avatar or transformation of Vishvow. This religion is that which prevails in India beyond the Ganges; it was received in China A. D. 65, and in established in Japan. A religion, very similar to this, is also that of the Lamas of Thibet. Indeed, all deviations from the original Hindoo system, retained the same general principles. The advocates of these all held the doctrine of the pre-existence of souls, their sublimating and acting independently of bodies, and their transformation into other bodies after death. They had the same low opinion of matter, and the same veneration for the elements of fire and water, as purifiers of the soul. They had similar restrictions with respect to food, the same additional edenics to divination, and the same idea of the use of corporeal austerities for the expiation of sin.

There can be no doubt of the very high antiquity of the religion of the Hindos, and it is not improbable that the commencement of all those systems which deviated from the religion of the patriarchs, preferred in the writings of Moses, was prior to the general dispersion of mankind. A system so ancient as that of the Hindoos must have been formed about the same time with that of the Egyptians, from which that of the Greeks, and other western nations, was in some measure derived; and accordingly many points of resemblance have been observed between them; too many, and too striking, to have been altogether fortuitous. Even some of the inhabitants of Ethiopia appear to have been of the same origin with those of Hindoostan (see Diff. relating to Aia, vol. i. p. 112.); and both the Egyptians and Ethiopians seem to have had some connection or intercourse with the Hindoos; but of what kind it was, or when it subsisted, we have no certain account; and they have been so long separated, that it is very difficult to trace in what their connexion was. According to Eufubius and Synceus, some people from the river Indus settled in the vicinity of Egypt in the reign of Amenophis, the father of Setoefiris, and many Egyptians, banished by their princes, settled in other countries, and some went so far as India. It is also supposed, that many of the priests of Egypt left the country on the invasion of it by Cambyses. But such circumstances as these are not of themselves sufficient to account for the great resemblance between the two systems. The Hindoos themselves say, that their sacred books came from the west, (see Ezoutredam, p. 15-17.) But the Hindoos, as well as their books, most probably came from that quarter, and their sacred books were composed while the seat of the empire was in Persia. The affinity of the Egyptians and Hindoos may be inferred from the similarity that subsists between some Egyptian words and those that occur in the ancient language of Hindoostan. The names and figures of the 12 signs of the zodiac, among the Hindoos, are nearly the same with ours, which came from Egypt through Greece, and each of these races preserved their proper weights, and the peculiarities of their own systems, so that the Egyptians and Hindoos had also the same division of time into years, months, and days, and they denominated each day by the names of the stars and planets. The resemblance between the oriental and occidental systems extends much farther than Egypt. The office and power of the Druids in the northern parts of Europe did not differ much from those of the Bramins; and the Etruscans, from whom the Romans derived the greatest part of their learning and religion, had a system very much resembling that of the Perfians and Indians, and they wrote alternately to the right hand and left. (See ETRUSCA.) Several remarkable "general principles" were held alike by the ancient Egyptians and the modern Hindoos. They both believed that the souls of men existed in a prior state, and that they go into other bodies after death. They had the same ideas of the body being a prison to the soul, and imagined that they could purify and exalt the soul by the mortification of the body; and from the idea of the great superiority of spiritual to corporeal substances, they held all matter in great contempt. They also both believed that plants had a principle of animality. Several religious ideas, and customs were common to both countries. The Egyptians of Thebes represented the world under the figure of an egg, which proceeded from the mouth of Cneus; and this resembled the first production according to the Hindoo system. Several of the Egyptian deities were both male and female, which corresponds to the figure of the "lingam" with the Hindoos. This obscene figure, or at least the "phallos," was...
was much used in the Egyptian worship, and from Egypt it was carried into Greece, where it was used in the mysteries of Bacchus. Beliefs, the licentious pollutions of the Egyptian women before their god Apis, were the same with those of the Hindoo women, before their idols, (see Brachmans); and, moreover, the Hindoos chuse their sacred bells by the same marks that were used by the Egyptians. The Egyptians worshipped the Nile, as the Hindoos do the Ganges; the pyramidal or conical form of the Egyptian temples resembled that of the pagodas: and the onion, which was held in veneration by the Egyptians, is not eaten by the Hindoos. Besides this resemblance of general principles, and religious customs, it is observable, that the Hindoos, Egyptians, and Greeks adopted the same gods, and paid homage to them under similar representations or images. The Egyptians held cows in much greater veneration than any other animal: they were sacred to Isis, and never sacrificed. That the cow was respected by the Hindoos is well known. Upon the whole, it is undeniable that a system, very similar to that of the present Hindoos, must have been of very great antiquity, and prior to the general dispersion of mankind. For the similar situations may lead to similar fictions, and corresponding practices, the above-mentioned similarity, which might be traced in a much greater number of instances, extends to too many particulars, to admit our accounting for it in this way: nevertheless, it is impossible that a system, so extensive and complex, and implying such abstruse metaphysics, as that of the Hindoos, should have been completed at a very early period. This must have been subsequent to the rudest age of mankind; and, therefore, we may well imagine, that it could not have had its origin long before the time of Moses. Whether the Jewish law-giver was acquainted with it or not, it will appear to any candid as well as accurate examiner of the one or the other, that he was far from deriving any advantage from it; nor is there in his writings any allusion to books pretended to be sacred, such as the Vedas, but only to such practices as were common to the Hindoos and other heathen nations.

The Hindoos seem to have preserved the knowledge of the Supreme Being, when the Greeks, and other more polished nations in the western parts of the world, had lost sight of him; and their civilization being brougth by inferior objects of worship, Some of their depositions of the deity are juf[t, and truly sublime. In the "Institutes of Menu" he is said to be "one whom the mind alone can comprehend, whose essence eludes the external organs, who has no visible parts, who exists from eternity, the soul of all beings, whom no being can comprehend." They also say, that "goodness is the very essence of God." (See Brachmans.) Nevertheless, the most sublime conceptions of Deity entertained by the Hindoos fall far below those that were formed of him by the Hebrews, and which are recorded in the sacred writings. In the Hindoo system the first production of the Supreme Being was something similar to the chaos of Mofes, an earth covered with water; and they speak of the "spirit of God" as moving upon it. One of the Hindoo fables, related by Father Bouquet (Ceremonies of Religion, p. 48.) bears some resemblance to the mofiac history of Paradise. The Hindoos say that the first man was called "Adam," and the first woman "Eve." The Hindoos have also a peculiar day of the week, which they appropriate to acts of religion, as prayer and fasting; and in agreement, at least in part, with the account of Moses, the Hindoos say that in the first ages of the world men were generally superior to the present race both in the length of their lives, and in the powers both of body and mind; but that, in consequence of vice, they gradually declined. The Hindoos have also preserved an unequivocal tradition of an universal deluge; and according to the "Puranas," books which are said to contain a faithful account of their doctrines, eight persons escaped the general deluge. A curious account of the intoxication of Noah, and of the behaviour of his three sons on the occasion, is given us from the Hindoo writings in the third volume of "Asiatic Researches." The 4th and 5th "avatar" of the Hindoos, as Sir W. Jones says (Diff. &c. v. i. p. 110,) relate to the punishment of impurity, and the humiliation of the proud; and refer, as he thinks, to the delusion from Babel. In the "Bagavadam" there are, besides the mofiac account of the deluge, the principal circumstances of the history of Ishmael, and the facrifice of Isaac. Several things occur in the Hindoo traditions, which greatly resemble some in the history of Abraham; and Brahma, the Hindoo law-giver, very much resembles this ancient patriarch.

The several inuences contained in the collection of the Hindoo laws, which we shall presently notice, are interwoven with the religion of the Gentoo, and revered as of the highest authority. The curious reader will discover an astonishing similitude between the institutes of this code and many of the ordinances of the Jewish law, between the character of the Bramins or priests, and the Levites; and between the ceremony of the scape-goat, under the Mofiac dispensation, and a Gentoo ceremony, called the "hummed jug," in which a horse answers the purpose of a goat. In this code we find some of the more extraordinary laws and customs of the Hebrew nation, such as were never received in the western part of the world; as that of a man taking the widow of his brother, in order to keep up his family. Polygamy appears also to have been allowed to the Hindoos, as it was to the Hebrews. Many obfolute customs and usages, alluded to in many parts of the Old Testament, may also receive illustration from the institutes of this code. It appears from the code, that the Bramins, who are the priests and legislators of the country, have relinquished all the secular and executive power into the hands of another cast or tribe; and no Bramin has been properly capable of the magistracy since the time of the fatte judge; the only privilege of importance which they have appropriated to themselves is an exemption from all capital punishment; they may be degraded, branded, imprisoned for life, or sent into perpetual exile; but it is every where expressly ordained, that a Bramin should not be put to death on any account whatsoever.

Among the Hindoos there is a considerable difference of opinion on the subject of creation; but in the following general outline they seem to be all agreed. They say, that after the Supreme Being had existed alone from all eternity, he resolved to produce other beings. But this production was wholly "from his own substance;" and after a certain period, they believe that every thing will be absorbed into him again, when he will exist alone as before. There will, however, be a succession of these creations and absorptions without end. At what time the first creation took place they do not say; but according to them, every thing that now exists has existed before, and will hereafter exist again. The great superiority of the spiritus to the corporeal part of man is the fundamental doctrine of the Hindoo system; and hence springs the satisfaction which the Hindoos always express on the separation of them. From the Indian philosophy it is probable that the Manichasians had their idea of an original difference in souls, some being necessarily good, and others bad. That all nature is animated, and that the souls which animate the lowest forms of things are capable of rising to the highest state, is inferred in the "Institutes of Menu."
GENTOOS.

Menu."' Thus it is said, "the souls that animate worms and insects, serpents, moths, bees, birds and vegetables, attain heaven by the power of devotion.

The doctrine of transmigration is one of the distinguishing tenets of the Gentoos. With regard to this subject it is their opinion, according to Mr. Holwell, that those souls which have attained to a certain degree of purity, either by the innocence of their manners, or the severity of their mortifications, are removed to regions of happiness, proportioned to their respective merits; but that those who cannot so far surmount the prevalence of bad example, and the powerful degeneracy of the times, as to deserve such a promotion, are condemned to undergo continual punishment in the animation of successive animal forms, until, at the flated period, another renovation of the four jouples shall commence, upon the dissolution of the present. They imagine five different spheres above this earth. The highest of which, called futter, is the reidence of Behi, and his particular favorites. This sphere is also the habitation of those men who never uttered a falsehood, and of those women who have voluntarily burned themselves with their husbands; the propriety of which practice is expressly enjoined in the code of the Gentoos law.

This is confirmed by the testimony of a very curious collection of Hindoo jurisprudence, which was selected by the most experienced pundits, or lawyers, from curious originals in the Shauri-Shahri language, who were employed for this purpose from May 1773 to February 1775; afterwards translated into the Persian idiom, and then into the English language, by Mr. Halhed.

We have already observed, that the Hindoos are divided into four great and original tribes, which, according to the Gentoo theology, proceeded from the four different members of Behi, the supposed immediate agent of the creation under the spirit of the Almighty. These tribes are the Brahmins, which proceeded from his mouth, and whose office is to pray, read, instruct, and conduct the sacrifices; the Chehterees, which proceeded from his arms, whose office is to draw the bow, to fight, and to govern; the Bce, proceeding from the belly or thighs, who are to provide the necessities of life by agriculture and traffick; and the Sooder from the feet, which are ordained to labour, serve, and travel.

Few Christians, says the translator of the Gentoo Code, have expressed themselves with a more becoming reverence of the grand and impartial design of Providence in all its works, or with a more extensive charity towards all their fellow-creatures of every profession, than the Gentoos. It is, indeed, an article of faith among the Brahmins, that God's all-merciful power would not have permitted such a number of different religions, if he had not found a pleasure in holding their varieties.

Mr. Holwell, and also Mr. Dow, attempt to extricate the Hindoos from the charge of polytheism and idolatry. "Let us rest assured," says the latter, "that whatever the external ceremonies of religion may be, the same infinite being is the object of universal adoration." But though the Hindoos acknowledge one Supreme Being, from whom all power is derived, they suppose that the immediate government of the world is placed by him in other hands. To these inferior deities their prayers and religious services are externally addressed; and this worship is encouraged and enjoined in their sacred books. According to their system, there sprung from the Supreme Being, as emanations of his divinity, an infinite number of futuriem deities and genii, of which every part of the visible world was the seat and temple. These intelligences did not rarely reside in each part of nature; but they directed its operations, each element being

under the guidance of some being peculiar to it. These inferior gods, being of various and opposite disposition and character, their worshippers adopted different methods of depreciating their anger, and soliciting their favour. Hence proceeded a great variety of whimsical and absurd, and also of cruel and dreadful, as well as impure, rites. The veneration of the Hindoos for the images of their gods subjects them justly to the charge of idolatry and polytheism; although the learned Brahmins pretend, that they do not worship the visible idol, but the invisible being represented by it. Mr. Sommert says, that besides those whom the Hindoo place in the rank of gods, they have also "saints," whose pictures they place in their temples, and that they address prayers to them as well as to their gods. Nor let it be said, that these are the accounts of travellers. In the sacred books of the Hindoos mention is made of various divinities besides the Supreme Being. The worship of the fun, says Mr. W. Jones (Diff. &c. v. l. p. 481) is principally recommended in the Vedas. The "Institutes of Menu," say, that the Supreme Being created an abominable interior deities, and divine attributes, and pure souls, and a number of gods equally delicate. The word mention is also made of demi-gods, and inferior genii, the despotic genera of the figures and lunar deities, &c. The worship paid to thrones, or ancestors, is a great article in the syllogism; and is mentioned almost in every page of the "Institutes." All the neighbouring nations, whose religions have some affinity to that of the Hindoos are polytheists. The ancient religion of the northern Europeans nations was, in several respects, similar to that of the East; and we find among them the acknowledgment of one Supreme God, with the worship of several inferior deities. Thus, their deities, Odin the God of war, Freo his wife, and Thor the god of thunder, were the principal objects of worship to all the Scandinavians.

It has been said that the polytheism of the Hindoos, and others, was mild and tolerant in its nature; but the fact is, that like the ancient Egyptians, they quarrelled with one another on account of their attachment to different deities, especially in Malabar; and mild as the religion of the Hindoos appears to be, and gentle as are their general manners, they can assume a very different character when their religion is concerned. The Danes, for instance, exterminated the Samaritans, and the followers of Buddha, with fierce and ferocious rage; none of them on the west side of the Ganges, under a pretence of their being atheists; and when any Hindoo is converted to Christianity, he is not only banished from his tribe, but abandoned to the insults of the whole nation. Such was the treatment of those who were excommunicated by the Druids. The Hindoos regard all Christians with the utmost abhorrence and detestation, as much below the lowest of their own sects. The Brahmins themselves can be cruel and malignant, where their religion is concerned. Nevertheless, when the Hindoos converse with Christians on the subject of religion, they profess to believe, as we have already observed, that the Supreme Being is equally pleased with all religions, and intended that all the different modes of it should be adopted by different nations.

Although there are many points of resemblance between the religion of the ancient Egyptians and that of the Hindoos, yet in many respects they are exceedingly different; for this, though they may have gone together at the fall, they must have branched at a very early period. The Hindoos never worshipping living animals, which is a principal feature in the religion of the Egyptians; and the names, the characters, and the images of their deities have very little resemblance to each other. But between the religion and mythological tables of the Greeks and those of the Hindoos, there
there is a very remarkable resemblance; though we are unable to trace any connection that ever subsisted between them.

The religion of the Hindoos seems to be much too complex to have been, as Sir W. Jones supposes, the oldest of all polytheistic and idolatry. It is evidently a refinement on something much more simple, and this seems to have been the system of the "Sammanes," whom the Greek writers mention as a sect of philosophers in India, opposed to the "Brachmanes," and to be the same with those who are now called "Schamans" in Siberia. See SAMANCANS.

Nothing can be more humiliating than the situation to which the Hindoo institutions reduce the female sex. According to the Vedas, the souls of women, as well as those of all individuals of the inferior orders, are condemned to continual transmigrations, till they are regenerated in the bodies of men. The female unfavourable character is amply justified by the representations that occur in the "Institutes of Menu," and the "Code of Gentoo laws." Such being, in the opinion of the Hindoo law-givers, the natural character of women, it is no wonder that little regard is paid to their evidence in courts of justice; nor can we be surprised that the birth of a female is no cause of rejoicing in a Hindoo family. In perfect agreement with such degrading ideas of the female character, the women must always be under the absolute control of men; nor has the subjection of the wife to her husband any bounds. As women are treated in this disrespectful manner, and considered as unqualified to read their sacred books, they are in general very ignorant, so that few of them can either read or write.

The devotion of the Hindoos is supposed to comprise all other duties; but their devotion consists in the frequent repetition of the names and attributes of God. The first thing in their prayer is to pronounce the word om, then excluding all sensible objects, even forbearing to breathe, and to think only on God. This kind of prayer serves for the pardon of sin and purification. This word om, on the pronunciation of which so much is supposed to depend, signifies, according to Sir W. Jones, Brahme, Vishnum, and Siva, or the three powers of creation, preservation, and destruction. This mystical word, he conjectures, may be the Egyptian ai, commonly supposed to mean the sun, and by the ancient idolaters the solar fire. The religion of the Hindoos confunds principally in obligations to the gods, i. e. to the inferior deities, and to the names of their ancestors; and these obligations are accompanied with many frivoulous ceremonies. Moreover, a great part of their religion consists in the austerities to which they subject themselves. Among other things, all fermented or spirituous liquors are forbidden, and they submit to various restrictions with regard to their food. To a genuine Hindoo nothing appears more heinous than the killing, and much more the eating of any thing that had life. The Hindoos are much devoted to pilgrimages for the purpose of bathing in dilant rivers; and they generally prefer the Ganges. In these pilgrimages, they practise singular austerities. Their fasts in honour of different deities are of long duration, and are very strictly observed; and they are thought to have singular efficacy in effecting all fins. See FAIRIES.

It is not uncommon with the Hindoos to devote themselves to certain and very painful death, under the influence of their wretched superstition. They throw themselves on the large iron hooks that are fastened to the wheels of the carriages, which carry the images of their deities in procession. Others lie sprawling on the ground for the wheels to pass over them, and thus bring death. But the most affecting instances of involuntary death are those of the Hindoo women, who learn themselves alive with the bodies of their deceased husbands. In this way of terminating life they indulge the hope of attaining the fame and bliss of happiness with them after death. This is deemed a kind of religious duty, though it is not regarded as of universal obligation. On the deaths of perfons of high rank and celebrity, these victims of superstitious, voluntary, or involuntary, are sometimes very numerous. At the death of a king of Tanjore, no less than 300 of his concubines leaped into the flames, and 400 burned themselves at the funeral of a minque, of Madura. (Maurice's Ind. Antiq. vol. ii. p. 165.) The Hindoo religion, which has been extolled as the mildest of all religions, formerly enjoined and constainted human sacrifice; and Sir William Jones says, that the ancient solemn sacrifice of the Hindoos was that of a man, a bull, and a horse. Among other superstitious notions and practices prevalent among the Hindoos, we may mention their execrable veneration for the cow, and also for the elements of fire and water. Peace of a singular and severe nature were enjoined for killing cows without malice; and if this crime was maliciously committed, it amounted to an expiation of whatever sort. Mr. Wilkins informs us, (Sketches relating to the history and op. of the Hindoos, vol. i. p. 234.) that the Brahmins are enjoined to light a fire at certain times, and that it must be produced by the friction of two pieces of wood of a particular kind; that with a fire thus procured their sacrifices are burned, the nuptial altar flames, and the funeral pile kindled. Their veneration for water, especially that of the Ganges, has already been mentioned; and perfons chuse to die in rivers from an idea, that the foul passing through the water, as it leaves the body, is purified from its impurities.

The Hindoo religion is little, if at all, more exceptionable than the ancient Egyptian, with regard to the extraordinariness and indecency of many of its ceremonies. Instances occur at their pagodas, which we have already noticed under the article BRACHMANS, and which it is needless here to repeat. (See also PAGODA.) Charms are also held in estimation among the Hindoos; a regard to them is authorized by their sacred books, and the practice of incantation is professed by their learned Brahmins. From a veneration for the elements of fire and water, and an opinion of their presiding somewhat of divinity, they have been deemed proper teuls of guilt, or of innocence. Hence has proceeded the trial by Ordeal; which see. With regard to the Hindoo doctrine of a future state, Mr. Dow says, that men first stone for their crimes in hell, where they remain for a space of time proportioned to the degree of their iniquities; then they rise to heaven, to be rewarded for their virtues, and thence they will return to the world to re-animate other bodies. The more learned Brahmins, he says, affirms, that the hell which is mentioned in the "Besang" is only intended as a bag-bearing to the vulgar; agreeably to the doctrine of the Greek philosophers. On the other hand, Mr. Holowell, contrary to all other accounts, which represent future punishment as in all cases finite, says, that whoever shall free himself by violence from this mortal body, shall be plunged in "Ordeles," for ever. According to another account of the religion of Malabar, they who destroy themselves go neither to heaven nor hell, but stroll about, and become what are called "Spirtis," under the power of the chief of the devils. Sometimes they enter into men, and then they become demons, and go about naked and mad, to disturb the neighbourhood, eating grubs and raw flesh. According to the Indians, says Mr. Della Valle, some very wicked men become devils. To conclude our account of the Hindoos, or Gentooos, we observe, that notwithstanding the
the unreasonable griefs which they lay on mere external observances of various kinds, there are not wanting in their writings some excellent moral maxims, similar to many in the books of the Old Testament, which represent every thing of this kind as insignificant, without moral virtue. A peculiar griefs, we find, even too great, is laid on the duties to parents; so as to supercede the obligation, and to depreciate the importance of other duties. Upon comparing the Hindoo sytem with that of Moses, the authority of the former is as apparent as the superior wisdom of the latter. With the Hindoos we perceive the rudiments, and more than the rudiments, of most of the arts and sciences, especially that of astronomy, of which most other nations are wholly ignorant. Yet while the Hebrews made no discoveries in science, they had a religion perfectly rational; and that of the Hindoos was absurd in the extreme. This, surely, is an argument of the internal kind in favour of the divine origin of the Hebrew religion, almost as irresistible as any argument from miracles. From the preceding sketch of the Hindoo religion, we must be led to acknowledge the necessity and utility of a divine revelation.

Those who are desirous of being farther acquainted with the principles, manners, and various institutions of the Gentoo, may consult Holwell's Interesting historical Events, &c. 1765. Dow's History of Hindoosan, 4to. 1768. and the Code of Gentoo Laws. Priestley's Comparison of the Institutions of Moses with those of the Hindoos and other Ancient Nations, 8vo. Northumberland, in America, 1799. For a further account of the religious tenets and practices of the Gentoo, see Brachmann. See also Shastan and Viedman.

GEN-TSING, in Geography. a town of China, in Setalcan, 87 miles N.W. of Hocheii.

GENUFLEXION, of genu, knee, and flexus, I bend, the act of bowing, or bending the knee; or rather of kneeling down.

The Jesuit Rosweyde, in his Onomacular, shews, that genuflexion, or kneeling, has been a very ancient custom in the church, and even under the Old Testament dispensation; and that this practice was observed throughout all the year, excepting on Sundays, and during the time from Easter to Whitsun tide, when kneeling was forbidden by the council of Nice.

Others have shewn, that the custom of not kneeling on Sundays had obtained from the time of the apostles; as appears from St. Irenæus and Tertullian; and the Ethiopic church, ferupulously attached to the ancient ceremonies, still retains that of not kneeling at divine service. The Russiuns esteem it an indenit poffure to worship God on their knees. Add, that the Jews usually prayed kneeling. Rosweyde gives the reasons of the prohibition of genuflexion on Sundays, &c. from St. Basil, Anatillius, St. Julian, &c.

Baronius is of opinion, that genuflexion was not established in the year of Christ 56, from that passage in Acts xx. 36 where St. Paul is expressly mentioned to kneel down at prayer; but Saurin shews, that nothing can be thence concluded. The same author remarks, also, that the primitive Christians carried the practice of genuflexion so far, that some of them had worn caviory in the floor where they prayed: and St. Jerome relates of St. James, that he had contracied a hardnec on his knees equal to that of a camel.

GENUS, in Algebra. The ancient algebraists distributed the art into two genera, or kinds; the logarithmic, and geometric; which see.

GENUS, in Systematic Botany, from genus, a family, implies one or more species of plants, differing essentially in their parts of fruitification from all others, and agreeing together in the general structure of those parts, as well as in one or more peculiar marks or characters. If a genus be perfectly natural and distinct, such characters in the fruitification are accompanied with more or less decided distinctions in the other parts of the plant, as well as in its general habit or aspect. On this principle it is contended by Linneaus and his school, that all genera are, or ought to be, natural, and that the genus ought to give the character, not the character the genus. The same principle is extended to the animal kingdom. Botanically, in the French school, on the contrary, maintain that all such affinities and distinctions are merely arbitrary, tending to facilitate the study of plants, but not at all founded in nature. It is singular that, with such ideas, these philosophers should not only strenuously contend for a natural sytem of arrangement, but object to the Linnean method, whose facility cannot be disputed, merely because it is not natural, terming it in their language esse natura. If genera are not natural, certainly the more comprehensive assemblages, of such genera into orders and classes, can, in no sense, be so. We nevertheless do not scruple to allow, that the principles of all such distinctions are founded in nature, though we readily admit that no system has as yet applied them correctly to practice, even with regard to generic, and far less to classical, distinctions. The latter indeed have been scarcely found capable of definition, or in fo vague a manner as to leave us most in doubt where precision is most wanted: and were it not for that intuitive, or at least practical, perception of affinities and differences, which is, by the French, contended to be inscrutable in judging of genera, we could certainly find at no knowledge of most of the natural orders of these leaves, not worse.

Examples of natural genera, each characterized by an essential character of its own, which distinguishes it, not only from every other genus in its natural order, but from every one hitherto discovered, are found in Quercus the Oak, whose acorn affords such a character; in Upefa, whose quadrangular nut is armed with spines that once conifhit the calyx-leaves; in Paraga, so well marked by the fringes and lucid bards that bore its pecufes; in Solancium with its many-clfted monocotetal corolla, and Eleacarpos, whose polypetalous one is similarly cut; in Geoflas, the only known instance of a papilionaceous flower with a drupa; not to mention a great number besides. Instances of good natural genera, distinguished by some one essential character from all others in their natural order, are found in Echium, whose irregular corulla keeps it distinct from all others of the Ajp ripolfa; Canonadica, known from other genera by its remarkable involucrum; Pimpinella distinguished from its allies by the g1obofe fymbes; Rumanca by the nectariferous pore in the claw of each petal; Pella by the prominent dilated partition of its pouch, extending twice as far as the valves; to which may be added many genera of the clafs Didymiua Gymnapfomia; see Smith's Introd. to Botany, 434. The Linnean leguminos Polypogon affords one of the most perfect examples of a natural class and order, of which all the genera are natural, and so well distinguished in habit, that any person at all observant of plants may know them by their foliage, inflorence, or general appearance, while their fruit affords clear essential generic characters. The natural family of Orchidacea, as arranged by Swartz and Brown, come very near the same point of perfection, but their differences of habit are less obvious. Such inipexes ought to riformulate the philosophical botanist te "go on from one degree of perfection to another."
another," though, like the Christian moralist, he cannot hope to reach the summit.

Lamarck has very well traced the indistinguishable origin, and gradual improvement of generic knowledge among botanists. In an early state of the science, some general associations were formed, though founded on vague and unphilosophical principles. The idea and name of a rose soon embraced many different species, and hence the dog-rose, the white-rose, the damask-rose, &c. were distinguished from one another, and a sort of generic and specific nomenclature arose, finally extended systematically to every plant by Linnaeus. Caspar Bauhin in his Pinax, anno 1623, first distinguished plants under a kind of generic sections, with some mention of the peculiar characters of each; but he did not profit, as he ought to have done, of the great principle first inculcated by Conrad Gersmay, that the parts of the flower and fruit afford the only clue to a scientific distribution of vegetables; a principle to which "the very existence of botany, as a science, is owing." Tournefort at length, adopting this maxim, undertook the arrangement of all known plants into genera, illustrating each by a figure of the parts of fructification, so as to display their distinguishing characters; but it was reserved for Linnaeus to define these characters in words, and thus to perfect the plan of Tournefort, as well as to reform it in many points, and correct some fundamental defects. He extended moreover his improvements to the clear definition and nomenclature of the species, which Tournefort had, without discrimination, merely collected, by their old appellations, under each of his genera, except indeed that he preferred an uniformity in his generic names.

Linnaeus did not at once hit upon the belt manner of defining his genera. His first aim was to describe all the seven parts of fructification in each, so that their differences might appear, which is the plan of all the editions of his Genera Plantaum. At length, in the fifth edition of his Systma Naturarum, published in 1753, he undertook a synoptical table of the short essential characters of the genera, and in the tenth he carried this plan nearly to the perfection in which he left it at his death. It has been adopted, not only by his pupils, but by the followers of his system of classification, and even by the celebrated Jussieu and his scholars, who have widely differed from the learned Swedish; as to other principles of arrangement, and who have certainly not improved upon his style of definition, terminology, or nomenclature. Jussieu indeed has, like Gouan, subjoined to the generic characters taken from the fructification, very useful indications of the habit, which invention of the latter botanist was highly applauded by Linnaeus.

Linnaeus termed the full descriptions in his Genera Plantaum, the natural character of each genus. They ought to accord with every species of each, but in large genera, many species of which have been discovered subsequently to their establishment, this is scarcely possible. Such characters as serve merely to distinguish each genus from every other in its artificial order, in the Linnaean, or any other artificial, ylem, are called specific; these are much better extended to as to include sufficient marks of discrimination between the genera under consideration and every other, and they then become the essential characters thus-named, which ought in every putative botanical work to stand at the head of each genus, or at least to be indicated by a reference. Lamarck, though much disposed to criticize the great Swedish Botanist, and differing totally from him respecting his opinion of natural genera, very candidly allows that "these essential characters are the result of one of Linnaeus's most happy ideas, and cannot but contribute greatly to the perfection of Botany." The same able writer affords entirely to the Linnaean maxim, founded on the good sense and penetration of Conrad Gersmay, that "generic characters ought always to be taken from the parts of fructification alone;" "at least," says Lamarck, "if that be always practicable." When it is not, he would borrow characters from any thing very decided in the habit; nor does he perceive that any inconvenience would result from it. To this we object the uncertainty of such characters, even when taken from what is least exceptable, the inflorescence. Of this no more striking example can be found than the Umbellata, as distributed by Linnaeus after the principles of his friend Artedi, in which, however it may be disfigured by sophistry, the inflorescence makes a leading part. Those who justify, like Lamarck, complain of the errors, unjustly termed by him arbitrary and voluntary errors, which are found in this part of Linnaeus's system, cannot but allow that they all originate from his having had respect to the inflorescence, that is, to the umbels and involucres, instead of the flowers and seeds, which if truly observed are fully sufficient in this, as, we believe, in every other natural order. Indeed the more we consider the subject, the more we are convinced that the inflorescence ought, like every part of a plant, to enter into our general contemplation before we decide upon a genus, it ought never to form a part of the technical or essential character. It is tempting enough to botanists who are not endowed with clear mathematical powers of discrimination and definition, to amplify their generic characters with any thing that, as they suppose, may give them additional strength. But characters, when too long, rather indicate feebleness in themsehves and in their authors, and endanger a return towards barbarism in a science, which has been raised to its present pitch of perfection by the didactic precision and decisive brevity of Linnaeus. S.

Genus, Kind, in Logic and Metaphysics, is that which has several species under it; or it is the origin and radix of divers species, joined together by some affinity, or common relation between them. See Classification.

Genus is a nature, or idea, so common and universal, that it extends to other general ideas, and includes them under itself, the more so as it is founded on a genus, in respect of man and brute; because man and brute agree in the common nature and character of animal; so a right-lined figure of four sides is a genus in respect of a parallelogram, and a rectangle; and so, likewise, is substance in respect of substance extended, which is body; and thinking substance, which is mind.

A good definition, say the schoolmen, consists of genus and difference.

In the general, genus may be said to be a class of a greater extent than species; and which is not convertible therewith: for though we may say, that all body is substance; yet it cannot be said all substance is body.

Add, that whatever may be said of the genus may likewise be said of the species under it, e. g. whatever is said of nari, being, will equally hold of the body.

The schoolmen define the genus logica to be, an universal which is predicatable of several things of different species; and divide it into two kinds: the one, the summum, which is the highest, or most general; and has nothing above it to respect as a genus: the other, the sublateral, which they likewise call m. d. m. a

Genus summum is that which holds the uppermost place in its class, or predicament: or that which may be divided into several species, each whereof is a genus in respect of other species placed below it.

Thus,
Thus, in the predicament of things subsiding of themselves, subsidence has the place and effect of genus sumnum, and is predicated of all the things contained in that class: for Plato, and man, and animal, and even spirit, are properly called subsidence. 

Accordingly there are as many sumnum genera, as there are classes of predicaments, or categories. 

Genus, fulvulum, is that which, being a medium between the highest genus and the lowest species, is sometimes considered as a genus, and sometimes as a species. Thus, bird, when compared with animal, is a species; when to a crow, an eagle, or the like, it is a genus. 

Genus, again, is divided into rerum, remote, where between it and its species there is another genus; and proximum, or next, where the species is immediately under it; as man under animal. 

Genus is also used for a character, or manner applicable to every thing of a certain nature or condition. In which sense it serves to make capital divisions in divers sciences; as music, rhetoric, botany, anatomy, &c. &c. 

Genus, in Magie. See Genera. 

Genus, in Natural History, we understand a certain analogy of a number of species making them agree together in the number, figure, and situation of their parts in such a manner, that they are easily distinguished from the species of any other genus, at least by some one article. This is the proper and determinate sense of the word genus, whereby it forms a subdivision of any class or order of natural beings, whether of the animal, vegetable, or mineral kingdoms, all agreeing in certain common and distinctive characters. See General name, and Classification of Animals. 

Genus, in Rhetoric, is one of the common places or topics, and contains under it two or more sorts of things differing in nature. From this head logicians reason thus: Because every animal is mortal, and man is an animal, therefore man is mortal. (See Genus, in Logic.) But orators make a further use of this argument, which they call ascending from the hypothesis to the thesis, that is, from a particular to a general. As if a person, speaking in praise of justice, should take occasion from thence to commend and dwell the excellence of virtue in general, with a view to render that virtue more eminent. For since every species contains in it the whole nature of the genus to which it relates, besides what is peculiar to itself, whereby it is distinguished from it; what is affirmed of the genus must, of necessity, be applicable to the species. 

Besides, authors distinguish the art of rhetoric, as also orations, or discourses, produced thereby, into three genera, or kinds; demonstrative, deliberative, and judicial. See each term. 

Genus, in Ancient Geography, a town of Italy, in that part of Magna Graecia called Messapia. It was situated a little S. of the road that led to Tarentum. 

Genzano, in Geography, a town of Naples, in Basilicata; 12 miles E. S. E. of Venosa — Alto, a town of Campagna di Roma, in Italy; 3 miles W. of Velcerti. 

Genzingen, a town of France, in the department of the Rhine and Moselle; 5 miles N. E. of Crefzentnach. 

Geocentric, of gea, earth, and centrum, centre, in Astronomy, is applied to a planet, or its orbit, to denote it concentric with the earth; or, having the earth for its centre, or the same centre with the earth. All the planets are not geocentric: the moon, alone, is properly geocentric.

Geocentric latitude of a planet, is its latitude seen from the earth; or the inclination of a line connecting the planet and the earth, to the plane of the earth's (or true) ecliptic. 

Or it is the angle which the subfixed line (connecting the planet and the earth) makes with a line drawn to meet a perpendicular let fall from the planet to the plane of the ecliptic. See Latitude. 

Thus in Plate XIII Afternoon, fig. 116, the angle $\angle T \pi$ is the measure of that planet's geocentric latitude when the earth is in $T$; and the angle $\epsilon \pi$ the measure of it when the earth is in $t$. 

Geocentric place of a planet, is the place wherein it appears to us, from the earth, supposing the eye there fixed: or, it is a point in the ecliptic, to which a planet, seen from the earth, is referred. 

Geocentric longitude of a planet, is the distance measured on the ecliptic, in the order of the signs between the geocentric place and the first point of Aries. 

Geodesia, that part of practical geometry which teaches how to divide, or lay out, lands, or fields, between several owners. 

The word is Greek, γεωδεσια, formed of γεος, earth, and δεσια, divide. 

Geodesia is also applied, by some, to all the operations of geometry which are performed in the field. 

This is more usually called surveying, (which see,) when employed in measuring of lands, roads, countries, provinces, &c. 

Vitalis defines geodesia the art of measuring surfaces and solids not by imaginary right lines, as is done in geometry, but by sensible and visible things: as by the sun's rays, &c. 

Geodes, in Natural History, a genus of crufulated bodies formed into large, and in great part, empty cases, including a small quantity of earthy or arenaceous matter. See Siderochita. 

Of this genus are five known species. 

Geoff, in Rural Economy, a term provincially applied to a mow of hay, corn, &c. See Stack. 


Gen. Ch. Cal. Perianth of one leaf, inferior, bell-shaped, five-cleft half way down; its two upper segments diverging, spreading. Cor. papilionaceous; standard roundish, emarginate, flat, reflexed; wings equal to it in length. obtuse, con-cave; keel compressed, the length and shape of the wings. Stam. Filaments in two fests (single and nine-cleft), the length of the keel; authors roundish. Pyl. German superior; roundish; style awl-shaped; stigma obflute. Peris. Drupa nearly ovate; large, with a longitudinal furrow at each edge. Seed. Nut nearly ovate. Somewhat woody, a little compressed, with a furrow along each edge, acute, of two valves. 

GEO

(Umar; Margr. Bras. 121.)—“Spinous. Leaflets oblong, obtuse.”—Native of Brazil, and the country about Carthagena, in woods on a sandy soil near the sea. Jacquin describes it as an inelegant tree, twelve feet high, with a few spikes on the trunk and larger branches, which are awl-shaped, and generally an inch long. Leaves pinnate, about seven pair, with an odd one, of oblong, obtuse, broad, entire leaflets, on a stalk four inches in length. Flowers nearly as long, white, in long, large, lateral spikes; Flowers a dirty orange, and their scent extremely powerful and offensive. Fruit like that of an almond in its coat, slightly greenish-yellow; the pulp soft, sweet, but of a nauseous smell, yellowish, flaming the hands with a rusty hue, very difficult to wash off. This fruit adheres firmly to the nut, whose kernel is white, mealy and astringent. Jacquin was justly surprised at meeting, for the first time, with a drupa to a papilionaceous flower, but he justly named it, in spite of any preconceived theory.

GEO


3. G. inermis. Swartz. Prod. 106. Woody. Med. Bot. t. 112. (Cabbage-bark tree of Jamaica; Wright in Phil. Trans. v. 67. 507. t. 10—Without spines. Leaflets lanceolate.”—Native of Jamaica and Martinico. A tall tree, whose whole wood is white, and so tough as to be preferred beyond all others for the shafts of carriages. The bark is celebrated remedy for worms in the intestines, administered in a decoction, syrup, powder, or extract, and given in gradually increased doses, till a nausea is produced. The leaves consist of five or six pair, with an odd one, of elliptic lanceolate, pointed leaflets, about three inches long. Flowers light-red, in very large muscule-branched, terminal, downy panicles. Fruit the size of a small plum.

GEOPHREA, OR GEOPROVA, inermis, cabbage-bark tree, or worm-bark tree, in the Materia Medica, is a native of Jamaica. (See the preceding article.) The bark of this tree, which has a mucilaginous and sweetish taste, and a disagreeable smell, was first noticed as a vermifuge by Mr. Peter Duguid (Eff. and Obs. Physic. and Liter. vol. 2. page 264.) But the fullest information concerning this tree, in respect to both its medical and botanical characters, has been communicated by Dr. Wright, who resided a long time in Jamaica. According to his account, the bark of this tree is powerfully medicinal, and its anthelmintic effects have been established in Jamaica by long experience. It may be given in different forms, as in decoction, syrup, powder, or extract; and the manner of preparing, and exhibiting these, are particularly stated by Dr. Wright. For the decoction, take fresh dried or well-preheated cabbage-bark, one ounce: boil it in a quart of water, over a slow fire, till the water is of an amber colour, or rather of a deep-coloured Madeira wine; strain it off, sweeten it with sugar, and let it be used immediately; as it does not keep many days. In order to obtain the syrup, add a double portion of sugar to any quantity of the above decoction. This syrup will retain its virtues for years. The extract is made by evaporating the strong decoction in bulino maris; to the proper confidence; it must be continually stirred, as otherwise the resinous part rises to the top, and on this, probably, its efficacy depends. The powder of well-dried bark is finely made, and looks like sap, though not of equal specific gravity. As this anthelmintic has also a narcotic effect, it is proper to begin with small doses, which may be gradually increased till a nausea is excited, when the dose for that patient is ascertained. A strong healthy grown person may at first take four table-spoonfuls of the decoction or syrup, three grains of the extract, or thirty grains of the powder for a dose. The dose must be diminished for younger persons; and children two or three years of age, may take a table-spoonful of the decoction or syrup, one grain of extract, or ten grains of the powder; and children of a year old, half the quantity. Cold water must not be drawn during the operation of the medicine, as it is apt to occasion sickness, vomiting, fever, and delirium. In this case, the stomach must be washed with warm water, after oil must be administered, and lime juice beverage used plentifully for common drink. The bark purges pretty briskly, especially in powder; thirty or forty grains working as well as 1/2 of a cup of coffee. In this mode of administering it, it does not seem to kill worms so well as in decoction. The cabbage-bark is a valuable remedy when used with proper caution; but some fatal accidents have attended the imprudent use of it, chiefly from overdosing the medicine. Phil. Trans. vol lvii. p. 597.

GEOFFREY OF Monmouth, in Biography, an early historian of our own country, who flourished about the middle of the 12th century, was first archdeacon of Monmouth, and then bishop of St. Asaph. On account of tumults in Wales he quitted his diocese, and obtained the abbacy of Abingdon in commendam. His clergy applied to him to return, which he refused, thinking he might still keep his abbacy; in this he was disappointed, and was left without any preference. As an historian he is known by his "Chronicon Historiae Britanniae." This work has been cenured for its fabulous narrations; the author is, however, entitled to much applause as a polite scholar. His Latin style rises greatly above mediocrity. He was author of many other pieces, among which is a poem on Merlin, which is much commended by Leland. The Chronicon is supposed to be translated from an ancient history in the Welsh language, and it contains a pretended genealogy of the kings of Britain, from the time of Brutus the Trojan, and enumerates upwards of seventy illustrious monarchs before the invasion of Julius Cæsar. This work has been frequently reprinted. Byde. Moreri. New Annual Register, vol. iv.

GEFFROY, ETIENNE FRANCOIS, a physician, was born at Paris on the 13th of February, 1672. His father was an apothecary, and had held the offices of sheriff and confid. While the young Geoffroy was pursuing his studies under his paternal roof, his father held regular scientific meetings, at which Cassini attended with his planisphere, Sébañen with his machines, and Joblot with his magnets, and at which Du Verney performed his experiments, and Homberg his chemical experiments. After an excellent foundation of general science was thus laid, his father sent him, in 1692, to Montpellier, to study his own profession of pharmacy under an experienced apothecary. Here he attended the courses of the most celebrated professors of the university, and afterwards travelled through the southern provinces before he returned to Paris. Already he had acquired considerable reputation; and, although not yet a physician, he was appointed to accompany the duke de Tallard, as his medical attendant, on his embassy to England, in 1698. In London he was much esteemed by Sir Hans Sloane, and other men of science, and was elected a member of the Royal Society. From England he went to Holland; and afterwards to Italy in 1700, with the abbé de Louvain. Natural history and the materia medica were among the principal objects of his inquiries; for his father intended him for his successor in his establishment at Paris, but he aimed at the higher walk of the profession, and with the consent of his father at length took the degree of bachelor in 1702, and that of doctor in 1704. His dissertation was mild
rild and kind to his patients, who, on his outlet in practice, were alarmed by the holens air which his sympath for their sufferings occasioned him to assume; but his reputation soon increased, and he was called in consultation even by the most distinguished members of the profession. In 1709, he was appointed by Louis XIV. to the professorship of medicine, which he filled by the death of Tournefort. In his new office he undertook to deliver to his pupils a complete history of the materia medica, upon which subject he had been for a long time collecting information. He completed his account of the mineral substances employed in medicine, of which he gave a most correct and ample history: and was employed on the vegetable kingdom, which he treated alphabetically, and carried no farther than the article Melia; on the animal kingdom he had not touched; but the whole of what he had delivered in his lectures was found among his papers in good order, and afterwards published. In 1712, he succeeded Fagou as professor of chemistry in the king's garden. In 1726, he was elected dean of the faculty, in the exercise of the functions of which he was led into some active and anxious disputes, which, together with the duties of his professorship, and of his other offices, destroyed his health, which was naturally very delicate. He lingered from the beginning of the year 1730 till the 6th of January, 1731, when he died. Notwithstanding his malady, however, he had the resolution to complete a work, which had been deemed necessary by preceding doctors, but never accomplished; namely, a pharmacopoeia, containing a collection of the compound medicines requisite to be kept by apothecaries, "Le Code Medicamenteux de la Faculte de Paris," of which two editions, enlarged and corrected, were afterwards published. His papers on the materia medica were published under the following title: "Traite de Materia Medica, five, de Medicamentorum simplicium historia, virtute, delectu, et usu," Paris 1741, 3 vols. 8vo, under the inspection of Antoine de Jullien. Several editions have been subsequently published. It was translated into French by Ant. Bergier, who published 7 vols. 12mo. in 1743, and the remainder in 3 vols. in 1750. Arnaud de Nobleville, and Salmor, physicians of Orleans, published a continuation of this work, under the title of "Histoire Naturelle des Animaux," Paris 1756, 1757, 6 vols. 12mo, which is deemed not unworthy to be ranked with the production of Geoffroy, Eloy, Dict. Nat. Hill.


Eff. Ch. Receptacle club-shaped, fleshy, generally compressed, short, with a prominent margin next to the stalk.

This genus of Fungi is founded by Perseon on the Clavaria ophioglosside of other authors, with some different species which resemble it, and which have the appearance of a little tongue, growing out of the earth upon a stalk. He enumerates and defines seven species. His G. kirsium is Clavaria ophioglosside of Sowerby's Fungi, t. 83; his G. glabrum is a smaller and smooth fungus, very like the fruiting spake of the lora. Ophioglossum, except in being nearly black.

GEOGNOSY. See GEOLOGY and MINERALOGY.

GEOGRAPHICAL. Mile is a minute, or the sixtieth part of a degree of a great circle. See DEGREE and MILE.

GEOGRAPHICAL Table. See MAP.

GEOGRAPHY, formed of geo, terra, earth, and graphie, to write; the doctrine or knowledge of the earth, both as in itself, and as to its affections; or a description of the terrestrial globe, and particularly of the known habitable part thereof, with all its subordinate divisions. Geography constitutes a branch of mathematics, of a mixed kind; because it considers the earth, and its affections, as depending on quantity; and consequently, as measurable: viz. its figure, place, magnitude, motion, celestial appearances, &c. with the several circles imagined on its surface.

Geography is distinguished from cosmography, as a part from the whole; this latter considering the whole visible world, both heaven and earth.

From topography and chorography, it is distinguished, as the whole from a part.

Gollitz considers geography as either exterior or interior: but Varenius more justly divides it into general and special: or universal and particular.

Geography, general or universal, is that which considers the earth in general, without any regard to particular countries, or the affections common to the whole globe; as its figure, magnitude, motion, heat, &c. This may be subdivided into absolute geography, which respects the body of the earth itself, its parts and peculiar properties, &c. relative, which accounts for the appearance and accidents owing to celestial causes; and comparative, which explains those properties that arise from comparing different parts of the earth together.

Geography, special or particular, is that which considers the constitution of the several particular regions, or countries, their bounds, figure, &c. with the mountains, forests, mines, waters, plants, and animals, &c. therein; as also their climates, feaons, heat, weather, distance from the equator, &c. and their inhabitants, arts, foods, commodities, customs, language, religion, policy, cities, &c.

Special geography may be subdivided, with regard to the several periods of its progress, into ancient, including a description of the earth, conformably to the knowledge which the ancients had till the decline of the Roman empire; of this kind Cellarius's Ancient Geography is an excellent summary; the geography of the mean age, which extended from the fall of the Roman empire to the restoration of learning; and modern geography, comprehending the actual description of the earth since that time. With regard to its objects and uses, special geography may be divided into naturall, which treats of the divisions and distinctions which nature has made in the surface of the globe, and the complexion, language, &c. of its inhabitants; historical, comprehending the different revolutions which any country or town has undergone; civil, or political, including the government of any country; historical, describing those countries and places that are mentioned in scripture and ecclesiastical history; ecclesiastical, giving an account of the ecclesiastical jurisdiction established and exercised in various countries; and physical, which considers not only the surface of the globe, but also its intrinsic nature and suffrance. Geography is very ancient, at least the special part thereof; for the ancient writers fearfully went beyond the description of countries. Of this kind is the geography which we find in the books of Moses, written about the year 1452 B. C. and that of Homer, in his Iliad and Odyssey, who flourished, according to the Arundelian marbles, 907 years B. C. The geographical knowledge we derive from Herodotus, who flourished about 445 years B. C., is very partial and imperfect. It chiefly relates to certain parts of Asia, and divers others unknown, as well as the northern and western parts of Europe; and also Africa, Egypt, and Libya excepted.

It appears (see Phil. Geog. i. c. 9.) that the early geographers, being destitute of mathematical in-
GEOGRAPHY.

...ments and of astronomical observations, began first to determine the situation of places according to climates; and they were led to fix upon these climates from the form and colour of certain animals which were to be found in those different countries. The appearance of asp, or of those called by them Ethiopians, and of animals of the larger size, such as the rhinoceros and elephant, suggested to them the line of division, where the limits of the Torrid Zone began towards the north, and terminated towards the south. This groover manner of dividing their climates must be considered as the first rude outline of geography in the more iliterate ages of the world. However this be, the Chaldseans and Egyptians, who were distinguished by their skill in geometry and astronomy, were of course the first persons that paid any particular attention to geography; and it is said that the first map was made by order of Scophires I., who conquered Egypt.

This Egyptian king, says Euthathius in his epistle, prefixed to his commentary on Dionysius's περιγραφή, having traversed great part of the earth, recorded his march in maps, and gave copies of his maps not only to the Egyptians, but to the Scythians, to their great advantage, also to have well surveyors among them; and hence some have imagined that they had a map of the Holy Land, when they gave the different portions to the nine tribes at Shiloh. (Joth. xviii. 4. 9.) And Josephus tells us (I. v. c. 1.), that when Joshua sent out people from the different tribes to measure the land, he gave them as companions persons well instructed in geometry, whose skill would prevent their deviating from the truth. We may therefore reasonably premise that a geometrical survey was then made of the Holy Land; though we cannot absolutely determine whether their measuring was only taken down in numbers, or regularly projected and digested into a map.

Besides the method of dividing countries by climates, already mentioned, the Egyptians and Babylonians adopted another, which was that of determining the situation of places, or their distance from the equator, by observing the length of their long and short days. This they performed by means of a gnomon, erected upon a horizontal plane, by which they were enabled to measure the length or shortness of the shadow cast by the gnomon in proportion to the height of the gnomon. For an account of this invention, and of the method of applying it, see Gvozyov.

From the days of Thales, and his immediate successors, who flourished in the sixth century before Christ, geography seems to have received little improvement for 200 years, till the establishment of the famous school of Alexandria; although Pythagoras and his disciples were rightly informed with regard to the true syllem of the world, as they placed the fun in the centre, and ascribed to the earth both its diurnal and annual revolutions. During this period we have an astronomical observation of considerable importance to geography, and the first Greek observation upon record; which is that of Meton and Euctemon, who observed the summer solstice at Athens on a day corresponding to the 27th of June, 432 years B.C. This solar observation would have given them an opportunity of determining the latitude of Athens at the same time, if they had known the simple manner of deducing the conclusion: for the length of the shadow of the gnomon was attentively watched at the moment of the solstice, the proportion of that to the gnomon's height was easily known, by which the angle of the sun's altitude would be given; and though the sun's greatest declination was not then accurately known, yet still the latitude of Athens might have been determined within the limitations of the error respecting the declination. We have reason to believe that Timocharis and Arisillus, who began to observe 295 years B.C., were the first who introduced the manner of determining the position of the sun, according to their longitudes and latitudes, which were taken with respect to the equator. This we know from Ptolemy, who has preferred many of their observations in his "Almagest," and particularly one, which gave rise to the famous discovery of the Precession of the Equinoxes: which see. It was after the precission of the equinoxes was fully established by Ptolemy, that the longitudes and latitudes of the stars were uniformly referred to the ecliptic instead of the equator. It was, therefore, by an easy translation, that Hipparchus would be led to adopt and displace the different parts of the earth according to latitude or longitude: this being only a new application or transposition of that artifice, which had been already so happily introduced in the arrangement of the constellations, and therefore equally proper to be adopted in tracing the meridians and parallels of the earth. Hipparchus must be universally allowed to have first fixed the solid foundation of geography by uniting it to astronomy, and thus rendering its principles self-evident and invariable.

Pliny N. H. i. c. 12., confirms this, when, after mentioning Thales and Sulpicius Gallus, who had both predicted eclipses, he adds, "that Hipparchus had foretold the revolution (of the eclipses) of the sun and moon for 600 years, comprehending the months, days, and hours of different nations, and the situation of places," by which it would seem that the latitudes and longitudes of these places were particularly given. But the fullest and strongest authority for appropriating this invention to Hipparchus, is that of Ptolemy in his "Geography," (i. i. c. 4.) who says, "that Hipparchus was the only author who had given the elevations of the north pole of a few cities, in proportion to the great number that were to be delineated, and such too as lay under the same parallels. &c. &c." And yet it is somewhat remarkable that though latitudes and longitudes were in this manner introduced and pointed out by Hipparchus, yet they were so little attended to till the days of Ptolemy, that none of the intermediate authors, such as Strabo, Vitruvius and Pliny, all of whom minutely described the geographical situation of places according to the length and breadth of the gnomon, have ever given us the least hint of the latitude or longitude of any one place whatever in the language of degrees and minutes.

When the true principles of geography were thus pointed out by this new invention of latitude and longitude, it was no wonder that maps were from thence made to assume a new form of projection essentially different from those in use prior to this period. For the history of the construction of maps, see MAP.

It was a constant custom among the Romans, after they had conquered and subdued any province, to have a map, or painted representation thereof, carried in triumph, and exposed to the view of the spectators. Thus the Romans, as they were the conquerors, became the Surveyors of the world. Every new war produced a new survey and itinerary of the countries where the scenes of action occurred, so that the materials of geography were accumulated by every additional conquest. Polybius, (l. 3. p. 123. ed. Caes.,) when he tells us, that at the beginning of the second Punic war, Hannibal was preparing his expedition against Rome, by crossing from Africa into Spain, and so through Gaul into Italy, says, "that all these places were
were measured or surveyed with the utmost care by the Romans."

Vegetius De Re Mil. (l. iii. c. 6.) has well described the surveys of particular provinces, with which certain Roman generals were regularly furnished before his march. In the preface to his "Cosmographia," further informs us, that Julius Ceasar ordered a general survey to be made of the whole Roman empire by a decree of the senate: selecting for this purpose persons well instructed in every branch of philosophy. The three surveyors were Zenodorus, Theodorus, and Polycletus, each of whom was appointed to survey a different division of the empire. This survey commenced in the consulship of Julius Ceasar and Marc Antony, in the year 44 B. C., and continued for twenty-five years one month and ten days, to the consulship of Quintus Saturninus and Lucius Cina, in the year 19 B. C. The Roman itineraries that are still extant, evidently flew with what accuracy their surveys were made in every province; and Pliny has filled the 3d, 4th, and 5th books of his Natural History with the geographical diliances that were thus measured.

Before the Romans engaged in this business, Necho, king of Egypt, ordered the Phenicians to make a survey of the triumphal arch of Africa, which was accomplished in three years: Darius procured the Egyptian ships, and the mouth of the Indus, to be surveyed. Thales of Miletus, Anaximander his disciple, who is said to have contructed the first map; Democritus, Eudoxus, &c., who made the use of maps common in Greece; Ariffagoras of Miletus, who prefuced to Cleomenes, king of Sparta, a table of brafs, on which he had described the known earth, with its seas and rivers; and other Greeks, availing themselves of the assistance derived from the Chaldeans and Egyptians, proficuated the study and enlarged the extent of this science. It appears that in the time of Socrates geographical maps were used at Athens; for this philosopher admired the pride and boast of Alcibiades, by defining him to point out his territories in Attica in a map: and Pliny relates, (l. vi. c. 17.) that Alexander, in his expidition into Asia, took two geographers, Diancetus and Buton, to measure and defcribe the roads, and that from their itineraries the writers of the following ages took many particulars. Indeed, this may be observed, that whereas most other arts had been fullers by war, the fifth book of the Natural History has been improved thereby. We also learn from Strabo, that a copy of Alexander's survey was given by Xenocles, his treasurer, to Ptolemy the geographer, who, as Pliny informs us, was admiral of the fleets of Seleucus and Antiochus. Hisbook on geography is often quoted both by Strabo and Pliny; and it appears that this author furnished Eratosthenes with the principal materials and authorities for constructing the oriental part of his map of the then known world. For the voyages of Ptolemy's under Seleucus, upon the Cepfan sea, and elsewhere, were a kind of supplement to those measurements given by Buton and Diancetus already mentioned, and by Nearchus and Oceanicetus, the two admirals who were employed under Alexander, and therefore Pliny quotes them immediately after. It appears likewise from the same passage, that Mégat-thenes and Dionysius were two surveyors sent into India by Ptolemy Philadelphus, for the purpose of geography: and their authority was sometimes set in opposition to Patroclus by Hipparchus in his criticism upon Eratosthenes. Later, Strabo, lib. ii. § 1. From the memorable era of Alexander's expedition and conquests and those of his immediate successors, geography began to assume a new face and form. For Eratosthenes, who is de-
time, and which he had actually in his possession. These
confident of various particulars, some of greater and others
of a less degree of authenticity. The principal were the
proportions of the gnomon to its shadow, taken by dif-
erent astronomers at the times of the equinoxes and
solstices; the calculations founded upon the length of the longest
days; the measures or computed distances of the principal
roads contained in their surveys and itineraries, and the various
reports of travellers and navigators, who often
determined the intervals of places by hear-fay and guess-
work. All of these were to be compared together, and
digested into one uniform body or system, and after this, were
converted and translated by him into a new mathematical lan-
guage, expressing their different degrees and minutes of
latitude and longitude, according to the invention of Hippar-
chus, but which Ptolemy had the merit of carrying into
full practice and execution, after it had been neglected for
upwards of 250 years. We have no reason to suppose, that
Ptolemy had in his possession real astronomical observations
sufficient to determine all the longitudes and latitudes which
he has given; in which case we ought always to remember, that
their degrees of accuracy depended upon the veracity of the
fact or suggestion communicated to him, from which they
were afterwards deduced. We have therefore no reason to
be astonished at the multitude of errors that are to be found
in it, when his original materials were so imperfect for ex-
cuting so large a work, as that of fixing the longitudes and
latitudes of all the places, coasts, bays, and rivers of the then
known world; an undertaking, which, even in our days, has
not hitherto been brought to any sufficient degree of ac-
curacy. The mistakes of Ptolemy ought to be regarded
with candour, as they arose from the ignorance of the age
in which he lived, which could give him no better informa-
tion, and not from ignorance or imputation on his own part.
Nevertheless, Ricciolus, Cellarius, Paul Meruh, and Sal-
manius have been too severe in their criticism and censure;
as if they were disappointed in not seeing this science in its
full maturity in the writings of Ptolemy; at a time when it
was evidently but just beginning to advance beyond the verge
of its earliest infancy. They might with equal justice con-
demn the modern geographers for giving no better account
of Nova Zembla, or New Holland, or of those continents
and islands that lie on the northern or southern extremities of
the great South sea towards the two Poles; of which the
knowledge which they could obtain was very imperfect.
The principal mistakes in Ptolemy took their rise from cer-
tain astronomical observations and surveys, which were sup-
pposed to have been made with accuracy in a prior age, and
which were adopted by this great geographer as genuine;
and they have been, for want of better information, copied
by succeeding geographers and inserted in their maps, as
being, in their opinion, of acknowledged and undoubted
authority. These mistakes, thus introduced, maintained
their places in all maps, by a kind of unquestioned prescription,
even to the commencement of the last century, and it
unfortunately happened that these errors related to that part
of the world which was least known to the ancient Greeks and
Romans. Thus, Ptolemy states the latitude of Byzantium to
be 45° 5' instead of 44° 17', the latitude according to mo-
dern observations. In this particular Ptolemy was misled
by Hipparchus, who is mentioned by Strabo (1. i.) as
having visited Byzantium, and made this observation in
person. The latitude of Marcellis, which was supposed to
be under the same parallel with Byzantium, was not, however,
so much mistaken, as by modern observations it has been
found to be 43° 17½ 45'; and allowance being made for the
now acknowledged diminution of the obliquity of the
ecliptic, (see ECLIPSTIC.) the result will be nearer the truth.
Another error of Ptolemy relates to the latitude of ancient
Carthage, which he has placed in 32° 20' instead of 36° 52',
the true latitude according to the best observations. This
error seems to have been copied or translated from a paf sage in Strabo (1. i.), in which it is stated that
at Carthage the gnomon has the same proportion to the
equinoctial shadow, which 11 has to 17, whence by plain
trigonometry we shall have the latitude of 32° 28', very
near that of Ptolemy. The third capital mistake of Ptolemy
relates to the length of the Mediterranean, which is generally
measured from the Straits of Gibraltar to the bottom of the
bay of Ifus, where Alexandria, Scanderoon, now
stands, whose ancient name was Alexandria ad Ilum. The
difference of longitude of Alexandria ad Ilum and Gibraltars,
according to Ptolemy, is 62° 0'; whereas the difference of
longitude between these two places, according to the latest
observations, is 41° 28', and Ptolemy's error is 20° 32'.
This error, which continued in all our maps, more or less,
till the beginning of the last century, took its rise from the
supposed surveys of persons of reputation, recorded by
Strabo. (See DEGREE, EARTH, AND LONGITUDE.) But
to return from this digression:—many valuable geographical
works appeared under Diosclian, Constentinus, and
Maximian, &c. Under the emperor Theodosius the pro-
vincial and itinerary chart or table, since known under the
name of Peutinger, was digested and formed; and the last
work, that ought to be classed with those of the ancients,
was the Notitia Imperii, attributed to Athéus, who lived
between the years 400 and 450 of the Christian era. The
ages of barbarism succeeded the fall of the Roman empire;
and the arts and sciences were obliged to seek refuge and pro-
tection from the Arabians and Orientalists in Asia; the
principal of whom, distinguished by their attention to geo-
ography, were Almamom, caliph of Babylon, and Abuleda,
a Syrian prince. (See DEGREE.) After the revival of
learning in Europe, and particularly during the two last cen-
turies, geography has derived very considerable accretions
from travels, voyages, and a variety of nautical and astro-
nomical observations.

The great misfortune of ancient geography, and which
indeed confined it to such a lingering state of infancy, was,
that the true method of determining with accuracy the dif-
ference of longitudes was a matter of such difficulty, and
remained so long unknown. One of the first attempts to
rectify the length of the Mediterranean was made under the
auces of M. de Périgre in 1635; and he also, with a
direct view of correcting the errors in the longitudes of dif-
ferent places, took particular pains to get observations made
at Marcellis, Aleppso, and Grand Câiro, of an eclipse of
the moon, which happened August the 27th 1635. Before
that time the difference of longitude between Marcellis and
Alessano had been supposed to be 45', but by these obser-
vations it was found only to amount to 30° (the real dif-
fERENCE has been since found to be 51° 58'); so that by this a
very considerable correction was made in the length of the
Mediterranean, by taking off the difference of one whole
hour, or 15'; at once. About this time eclipses of the sun
and moon were thought sufficient to determine the longitudes
of all places with a tolerable accuracy. But, in the event,
the abode astronomers soon found that from these eclipses,
however carefully observed, no clear deduction could be
made of the longitude of any one place to any sufficient de-
gree of exactness. Hence several eminent astronomers,
such as Fourniers, Kircher, and even Ricciolus, who had
collected the observations of no less than 56 eclipses of the
sun and moon, between the years 1560 and 1658, gave up
the
the correction of geography by the application of eclipses of the sun and moon alone, as a fruitful and desperate undertaking. At length recourse was had to the eclipses of the satellites of Jupiter, and they were found essential for the purpose. It was some time, however, before the theory of the secondary planets was regularly reduced to tables; and though Simon Marius first, and after him Baptista Hodierna, composed ephemerides of their motions, yet nothing of that sort was found to be sufficiently accurate for the purposes of longitude, till M. Caffini published his tables of the revolutions and eclipses of the satellites in 1663. The first opportunity of effectually applying this theory to the rectifying of geography was nugatified by M. Caffini, and taken by M. Picard in 1671 and 1672, who, at the observatory of Tycho Brahe at Uraniborg, observed two immersions and three eclipses of the first satellite of Jupiter, which were afterwards compared with the fame observed by M. Caffini at the observatory at Paris. This first experiment gave at once the difference of longitude in the clearest manner beyond the possibility of a doubt; and it likewise afforded the certain prospect of rectifying the whole extent of geography as to longitude, upon principles that were self-evident, and not liable to any mistake whatever. In consequence of this success, M. Picard and M. De la Hire, were immediately employed in correcting the map of France in doing which they were obliged to contract it every where within less boundaries than it was supposed, according to their former maps, to have occupied; inasmuch that Lewis XIV. jealously said, that he found by their journey he had suffered a loss of part of his kingdom. Other academicians determined by the fame method the longitude of the isle of Goree, near cape Verd, on the coast of Africa, and of Guadaloupe and Martinico in the West Indies. And when M. Caffini had corrected his tables of the satellites of Jupiter, and published a new edition of them in 1693, M. Chazelles was sent up the Levant to observe the longitudes and latitudes of Scanderoon, Alexandria, and Constantinople, in order to determine the length and breadth of the Mediterranean, which he executed with great ability.

Since the correction of longitudes has been introduced by means of the satellites of Jupiter, other methods have been also adopted and devised, which are proper and effectual for that purpose; such as the transits of Mercury and Venus over the body of the sun; occultations of the fixed stars by the moon; and since the lunar tables have been improved by M. Mayer and others, another mode equally applicable to this important object, has occurred, by measuring from time to time the exact "differences of the moon from the sun," and "from a fixed star" of the first and second magnitude. In this mode there is a limitation of error, which so far gives a degree of satisfaction, and prepares the way for bringing the point that it thus unsettles to a more speedy and certain determination. Instruments of observation have also been improved; and time-pieces have been contrived, free in a great degree from the error and uncertainty of those that were formerly in use. See Chronometer and Clock. See also Ephemerides and Longitude.

For a fuller account of the history of ancient geography, see the preface to Bertius's edition of Ptolemy's Theatrum Geographicum Veteris, fol. For a brief history of the rise and progress of geography, see Varenius's Geog. and the Introduction to Blair's Tables of Chronology.

The art, however, until now, has been exceedingly defective; as a great part of the globe was then unknown; particularly all America, the northern parts of Europe and Asia, with the Terra Australis, and Magellanic; and as they were ignorant of the earth's being capable of being divided round, and of the torrid zones being habitable, &c.

The principal writings on this art, among the ancients, are Ptolemy's eight books; among the moderns are, Johannes De Sacrobosco De Sphere, with Clavius's comment; Riccioli's Geographia and Hydrographia Reformata; Weigelius's Speculum Terra; Dechales's Geography, in his Mundus Mathematicus; and above all, Varenius's Geography, with Jurin's additions; to which may be added, Lohnecht's Elements and Geographie generally; Sturmiius's Compendium Geographicum; Weigelius's Geography, in his Elementa Mathematica; the preface to M. Robert's Atlas; the introduction to Buchinger's Geography; the works of Duval, Briet, Delisle, D'Anville, Banne, Briache, Mentelle, the Sanfons, Hovann Morvilliers, Martiener; Pinkerton's Geography, Gordon's, Salmon's, and Guthrie's Grammars, &c. Hornii Orb. ant. delineatio, Cluerius, Cellerius, Pomp. Mela, &c. &c.

The reader will find under the appropriate terms in this Cyclopaedia, such information concerning the subjects which they expect, as is consistent with the nature and limits of the work; and it would be, therefore, altogether superfluous to detail them in this place, and, in to doing, to transcribe articles that will be found in their proper places. See Altitude, Amphith, Astrol. Stars, Circles, Climate, Columns, Degree, Earth, Ecliptic, Equator, Equinoctial, Globe, Heptarchy, Horizon, Latitude, Longitude, Map, Meridian, Mountain, Ocean, Parallels, Peripheries, Pole, Sphere, Sphere Oblique, Parallel, and Right, Tropics, Zones, &c. &c. &c.

GEOLOGY, in a strict sense of the word, or Geography, is the science which illustrates the structure, relative position, and mode of formation of the different mineral substances that compose the crust of the earth. This interesting part of mineralogy principally owes its distinguished rank it now holds among the sciences to the celebrated professor of Freyberg, who has however separated geology, or the science to which the above-given definition applies, from geology in the sense in which the word is taken by him; considering the latter as merely a speculative branch of knowledge, and as having nearly the same relation to the former as botany has to natural history. Geology, however, finds its basis in its attempt upon enquiring into the primordial state of the globe, is connected with the art of observing, of collecting, and arranging simple facts in order to ascertain what can be known respecting the relative situation and ages of mineral substances.

Geology (in the sense in which the word is taken by Werner) applies to the higher merit of recording the events of periods, when the planetary system of which the earth forms a part was yet uncreated, and of ascribing causes to effects, and explaining phenomena, before it is ascertained whether they really have existence, or are merely the offspring of fancy and ignorance. The framers of the most of the theories of extravagant notions, known by the appellation of theories of the earths (see Earth and Theories of the Earth,) have been satisfied with a very moderate share of materials for their structures, not to mention that most of them were utterly unacquainted with the nature of the fulminations, the origin of which they undertook to elucidate. Nothing is better calculated to flatter fell-lover than to be mentioned as the creator of a theory of the earth; nothing easier, with a moderate share of imagination and a knowledge of facts, than to frame a new theory sufficiently distinct from all its predecessors to be noticed; and nothing safer than to branch opinions which, though they cannot be proved true by their authors,
are certain to be left unruffled by others. And who would be defruous to waffe his time in refuting, or even remembering, all the theories of the earth now extant? Their number, amounting already to above half a hundred, appears to be daily increasing, and fands in need of clarification to afflit the memory; which, it must be allowed, might be more profitably employed in retaining those general observations which, unconnected with any theory of the earth, or with the Moabie account, have in latter times been presented to the world by a few unprejudiced geognosians. Indeed of premature endeavours of the kind, if the literature of the world is considered, we find the events hinted at in the field of geology, which was by no means intended for a system of geology; we should commence our researches in this field of knowledge with subverting to a careful examination what nature produces as it were under our eyes, such as the manifold alterations that have taken place in the physiognomy of tracts of country almost within the memory of man. How little are we acquainted with the means which nature employs to form the very soil on which we tread, by converting into mould the various animal and vegetable exuviae! How scanty are the genuine observations we possess on the processes of alluvial deposition! on the detritus accumulated at the foot of mountains by means of the decomposition of the various rocks! How little do we know of the processes employed to produce petrifications! and how little of the circumstances under which the latter occur! And yet many of these, and other phenomena within the sphere of human observation, will admit of considerable elucidation, and may lead to very interesting results, by applying to them the found principles of logic and induction. But researches of this nature require we few are inclined to follow upon them, the latent of development, and, what falls to the lot of few observers, a facility of combining and generalizing isolated facts. As an instance both of the difficulty and utility of such researches, if properly conducted, and of the little attention that has hitherto been paid to considerations that should precede any attempt at framing a system of geology, we advert only to the highly interesting discoveries made within the last twelve years, by Cuvier in the neighbourhood of Paris. It is in the confined space of the well known gysps-formation of that part of France that this incomparable naturalist has found the offside remains of no less than fifteen quadrupeds, unlike any species now known to exist. Have these beings, it may be asked, lived in the places where their remains are found, or have they been carried thither? and are they still to be met with living, or to be considered totally or partly destroyed? It is obvious that the cauks to be aligned for the occurrence of these petrifications must be diametrically opposite according as these two simple questions are answered in the affirmative or negative; and yet somebody has thought it worth while to satisfy himself respecting this circumstance; nor have any of the authors of the ten or twelve hypotheses that profits to explain the formation of the basin of Paris, been aware that in a solitary small corner of that basin, namely, at Grignon, there have been discovered by Lamarck, in the course of several years, about six hundred unknown species of shells, besides forty or fifty, of which the prototypes are supposed to be still existing.

We shall not attempt in this article to give a history of geology, which would be nothing more than a chronological exposition of the different theories of the earth (see Earth, and Theories of the Earth), nor is it to naturalists of earlier periods than the latter end of the last century, that we are indebted for genuine observations in this department of science. But much as we owe to the exertions of a Lehman, Deluc, Dolomieu, and particularly Saussure, who, in his celebrated agenda, has proved how well he knew the defiderata of geology, and what remained to be done to give this branch of knowledge all the perfection it is susceptible of; yet the merit of arranging, into a harmonious whole, a multiplicity of materials furnished by an intimate acquaintance with the internal structure of a considerable and highly interlacing tract of country, is entirely due to Werner; who, being afflicted by the most profound knowledge of the various mineral substances, and gifted with a happy faculty of generalizing facts, has produced a system of geology, at once simple and practical, and much more free from gratuitous assumption than all the rest. Professor Jameson is the first in this country who has given an exposition of the Wernerian geology, constituting the third volume of his "Mineralogy." The following is intended only as a brief sketch of that system, fuller details of which will be found under the various articles referred to.

The surface of the globe, considered relative to its inequalities, is divided into highland, lowland, and the bottom of the sea. The highland comprises, 1. Alpine land, composed of mountain groups or series of mountain chains; 2. Mountain chains, formed by a series of those still more simple inequalities, called 3. Mountains: in the former we consider their length, height, form, and connection; the parts of the latter are the foot, the acclivity, and the summit. See Mountains, and Mountain Groups.

Lowland we call those extensive flat tracts which are almost entirely defilite of small mountain groups, which latter, if they occur in them, generally occupy the middle part of the lowland. The principal lowland in Europe is the eastern part of Great Britain, the north of France, the adjacent Netherlands, the northern part of Germany and Sileia, the whole of Poland, the N. W. part of Russia, towards the Ural mountains, a very small part of Sweden, namely, Gothland. The second extensive lowland plain is in the centre of Asia; it is known by the name of the Steppes, and includes almost the whole N. E. part of Russia; some smaller ones are in Arabia. The extent of the lowland of Africa is not known. America has two considerable lowland plains: the one, in its northern half, is traversed by the Mississippi and Missouri, and borders towards the east by the Appalachian mountains, and the West India islands; the second, in South America, borders on the Andes. With these plains of the lowland are connected the river-courses, or river valleys, in which we have to consider the bed of the river and the holm or haugh land, the high and low bank of the river. (See River-courses.) The inconvenient rising ground with which the lowland plains are frequently marked, is, by German geognosians, called Landtucke when they are nearly of equal length and breadth, and Landrücker when they have an elongated form.

The bottom of the sea, or that part of the globe which is still covered by water, may equally be considered with a view to its depressions and elevations; to the latter belong the flat, the rocky bottom, the fossils, reefs, and islands. See Sea and Island.

It is only after a diligent study of the inequalities just pointed out, that we can with advantage undertake to explore the means employed by nature to produce them; and the first step is to proceed to the examination of the physical causes of the flow, but unceasing changes of the globe. Observation teaches us, that most of the elevations and hollows we meet with on the surface of the earth owe their origin to the action of the atmosphere, to that of the ocean, and to volcanic fire. These powerful agents may be considered
confured with regard to their deifying, and, in consequence of this deification, with regard to their forming effects. The waters of the ocean possess the form of the oceanic powers in a superior degree: whole marine districts are known to have been overwhelmed by their irregular action upon the land; but also the regular motion of the sea, ebb and flood tide, currents, &c., considerably contribute to gradually changing the face of the bottom of the sea, and of the shores on which they act. The destroying effects of the atmospheric waters are both mechanical and chemical; the former are produced by long continued rain, water-spouts, ice, snow, thaws, and consequent floods, by which considerable portions of rocks are detached and carried, together with other loose materials they meet, to more or less distant places, according as the bulk of these materials or the nature of the country, either favour or impedes their progress. The chemically destroying effects of water are less rapid, and depend on the solubility of the different rocks over which they flow. The forming effects of water, both mechanical and chemical, are the natural consequence of its destructive effects; examples of the former are sandbanks, changes of coasts, &c. Of the latter, beds of salt, calcareous, and other depositions, &c. See WATERS, ATMOSPHERIC, and OCEAN.

The effects of volcanic fire are destroying by means of the consumption of the inflammable materials, by denudation and fusion; and forming by sublimation, and by the production of lavas and other volcanic ejections, by sublimation, &c. See VOLCANO.

From the detection of the inequalities of the surface of the earth, and of the means employed in forming them, the Wernerian school proceeds to the consideration of the internal structure of the earth, the knowledge of which we derive from a careful examination of the order which nature has followed in the deposition of the mountain masses, and which is principally laid open to view in the clays and sediments produced by floods, &c. in natural caverns and in the interior of mines. By these means we may be acquainted with four different structures, besides that of the simple soil, which is the object of Oryctology: 1. The structure of rocks or mountain rocks; these are either simple (such as limestone, clay-flate, ferpenite), or aggregated, in which case the principal kinds of texture of the component parts are granular, flaty, porphyritic, and amygdaloidal. (See ROCKS.) 2. A more general structure is that of mountain masses; these have either a simply stratified structure, or, when a mountain, or mountain masses are composed of one species of rock divided into parallel tabular masses or strata; or they consist of alternating strata of different rocks, which in this case are called beds. Mountain masses also display what is termed folded structure, in which distinct concordances on a large scale are observable, such as the columnar, the large-globular, and the club-shaped structure, several modifications of which are observed in basalt. Another variety of this structure is called tabular folded structure, which is not unlike stratification. (See MOUNTAIN MASSES, and STRATA.) A still more general structure is 3. The structure of formations, which term Werner applies to a determinate assemblage of several similar and dissimilar rock masses which constitute an independent whole. If the mafs is uniform throughout; if, for instance, it consists entirely of sandstone, granite, &c. it is termed simple, whereas it is a compound formation, if it exhibits dissimilar masses, such as black coal with fletz-trap, &c. Some formations constitute the principal mass of a mountain in which they occur, (gneifs, clay-flate, porphyry, &c.) while others occur only imbedded (porphyry, limestone, &c.); and these beds, if they occur in different principal formations, and always under the same circumstances, notwithstanding the difference of the rocks in which they are found, and if, moreover, they form members of a series of formations, are considered as, and designated independent formations. If the reverse of all this is observed in single beds, they are called subordinate to the formation in which they are imbedded, as is the case with the beds of rock-flate, in the second sand-flate, &c. For forms further distinctions, see RESTORATION, MINERAL.

The most general of the structures we know is 4. That of the crust of the earth, composed of rock formations which cover each other in certain directions, and in a regular manner. As to the original extent of formations in general, Werner terms universal formations those which, without great interruptions, surrounded the whole globe, and thus constitute the greater part of its crust; to it belong almost the whole of the primitive, transition, and flate-formation. Partial formations, on the other hand, are those that appear only in detached spots, and exhibit characters distinct from those of the universal formation; thus the deposition at Wehran in Lusatia (which Werner supposes to be the residuum of a small and partial flood) is composed of sand-flate, limestone, bituminous flake and iron-flate, which all rest on loose flate. The present extent and continuity of formations are so far different from the original, that those called universal often appear broken into small detached portions, frequently resembling partial formations, and they receive different names according to their different shapes, and the situations in which they are found. Other considerations relative to the structure of the crust of the globe are derived from the position and direction of the strata in regard to the fundamental or subjacent rock, from the direction of the strata without reference to the fundamental rock, and from the relation of the outgoings (i.e. the upper extremities of the different strata as they appear at the surface of the earth), to the exterior of the mountain; for which see STRATA.

A comparison of the different classes of rocks, and their succession and stratification, points out the following distinctions. The clays of rocks on which all others rest, and which, on that account, is considered as the oldest, is the class of the primitive rocks, whose texture is often more or less crytalline, a quality denoting previous chemical solution. They comprehend granite, gneifs, micaceous, talc-flake, hornblende-flate, fynite, porphyry, ferpenite, and limestone. These rocks are mostly disposed in conformable and unbroken stratification, each younger stratum with lower level, as is the case with gneifs, mica-flake, and clay-flake, while the granite beneath will sometimes appear to rise up through them, encompased, in various manners, by the other rocks. (See ROCKS, PRIMITIVE.) The rocks next in succession are such as are likewise principally composed of chemical productions, but in which mechanical deposition is observed more abundantly the nearer they approach the following clays; the rocks constituting the intermediate classes are called transition-rocks. Limestone occurs more frequently in this than in the preceding clays; the other rocks it contains are principally green-wacke, grey-wacke flake, and clay-flake. (See TRANSITION-ROCKS.) To this succeeds, as of flatter origin, the clays of flett-rocks, in which the mechanical deposits occur in greater abundance, at the same time that the chemical precipitation disappears. (See FLEET-ROCKS.) The next clays which bear the character of flate more recent formation, is entirely composed of mechanical deposits, such as sand, clay, &c. (See ROCKS, ALLUVIAL.) But, besides these formations, the outgoings of which shoal gradually diminishing levels from the older to the newer, there are two others, the flate...
of which, instead of having parallels with, are superincumbent on, the outgoings of the other strata: they are called the newet flate-trap, and the newer porphyry formation, and are seen to rest both on flate-strata of very recent formation, and on elevated primitive mountains. The former of these formations is particularly interesting, as including rocks, whose origin has been, and continues to be, a subject of controversy between the Neptunists and Volcanists, such as basalt, wacke, &c. all of which, according to Werner, are the results of a deluge, or sudden rise of the water at a more recent period than that within which the flate-strata at first were formed. (See Flate-Rocks and Tra[p-Formation.)

The latter of these great formations, occurring in the same unconformable stratification, consists of porphyry, fymite, and pitch-flone, and is supposed of much older origin than the newest flate-trap formation, with which, however, it agrees in many respects. See Porphyr.

No geologist before Werner has pointed out the succession in which the different suites of formations have been deposited from the water at different periods; a succession which shows the alterations that fluid has undergone with regard to the substances it held, at different times, either chemically dissolved, or mechanically floating. Thus the oldest of the primitive rocks contain metals almost peculiar to them, and which, therefore, were not again deposited in succeeding periods, such as tin, molybdenum, and tungsten; and in several cases, one and the same substance, (such as lime-flone,) though it be repeated at considerable intervals, still adopts in each of them a peculiar character. These suites are, 1. That of the fymite-flone formation, beginning with the primitive crystalline granular limestone, and passing, by indefinite gradations, through the transition, and flate-line flones, into the lowermost links of the series, viz. chalcedony, and calcareous flane. 2. That of the flate formation: its central point is flate-flone (from which this formation derives its name), passing, on one hand, through mica-flone into gneiss, when the flane structure gradually disappars, and a paifage is formed into the oldest member, namely granite; and, on the other hand, through transition-flate, grey-wacke flane, and grey-wacke, into the series of flate-flone, and from thence into the alluvial series, confilling of flane clay, bamm. flane, and gravel. 3. The trap-formation flane passes from the primitive hornblende-flone, characterized by its crystalline nature, and from the primitive green-flone, and green-flone flane, through the transition green-flone, into the flate-flone, formed chiefly of augitoid, and from thence into the newest flate-trap formation, confilling principally of basalt and wacke, unconformably superincumbent on rocks of various antiquity. 4. The porphyry formation flane is equally characteristic in its different members, from old primitive porphyry down to that mentioned above, as of familiar origin with the newest flate-trap formation; the nature of the different members of this formation demand, however, in need of further examination. (See Porphyr.) 5. The gypsum-flone comprises three principal members, the oldest of which, or the primitive gypsum, occurs in mica-flane and clay-flone; the second and third are flate-gypseum, the former of them accompanying the following, or 6. Salt-flone, which comprises two series, one of which occurs only with flate-gypseum, (see Flate-Rocks,) while the other is still forming on the bottom of lakes, &c. (See Rock-Salt.) 7. The coal-flone flane, comprising, besides the independent coal formation, various varieties of coal belonging to the flate-trap formation, and to alluvial depositions; the members of this suite require farther investigation. (See Flate-Rocks, and Coal.) 8. The fpeclai-flone flane is composed, as far as we know, of two members, the first or older occurring with primitive rocks, especially primitive lime-flone, in conformable stratification; and the second or newer, found in an unconformable and overlying position on the older rocks. See Serpentine.

For further particulars relating to the Wernerian systenm of geology, we refer to the articles Strata, Vein, and Waters, Division of.

GEOMANCY, Geomancy, a kind of divination, performed by means of a number of little points, or dots, made on paper at random; and considering the various lines and figures which these points present; and thence forming a pretended judgment of futurity, and deciding any question proposed.

The word is formed of the Greek γη, terra, earth; and μαγία, divination; it being the ancient custom to cast little pebbles on the ground, and thence to form their conjectures; instead of the points afterwards made use of.

Polydore Virgil defines geomancy a kind of divination performed by means of clefts, or grotts made in the ground; and takes the Persian Magi to have been the inventors thereof.

GEOMETRICAL, something that has a relation to geometry.

Thus we say, a geometrical method, a geometrical genius, geometrical likeness, geometrical conduction, geometrical demonstration.

Geometry itself seems to lead us into errors; after once reducing a thing to geometrical consideration, and finding that it answers pretty exactly, we pursue the view, are pleased with the certainty and agreeableness of the demonstrations, and apply the geometry farther and farther, till we often outrun nature.

Hence it is, that all machines do not succeed; that all compositions of music, wherein the concords are the most rigidly observed, are not agreeable; that the most exact astronomical computations do not always foretell the precise time and quality of an eclipse, &c.

The reason is, that nature is not a mere abstruse; mechanical levers and wheels are not geometrical lines and circles; as they are often supposed to be: the taste for tunes is not the same in all men; nor at all times in the same man: and as to astronomy, as there is no perfect regularity in the motions of the planets, their orbits hardly seem reducible to any fixed, known figure.

The errors, therefore, we fall into in astronomy, music, mechanicks, and the other sciences to which geometry is applied, do not properly arise from geometry, which is an infallible science, but from the false use, or the misapplication of it.

GEOMETRICAL Construction of an equation, is the contriving and drawing of lines and figures, whereby to demonstrate the equation, theorem, or canon, to be geometrically true. See Construction of Equations.

GEOMETRICAL Line or Curve, called also algebraic line or curve, is that wherein the relations of the abscissas to the semi-ordinates may be expressed by an algebraic equation. See Curve.

Geometrical lines are distinguished into classes, orders, or genres, according to the number of the dimensions of the equation that expresses the relation between the ordinates and the abscissas: or, which amounts to the same, according to the number of points in which they may be cut by a right line.

Thus a line of the first order will be only a right line: those of the second, or quadratic order, will be the circle, and
GEO

and the conic sections; and those of the third, or cubic order, will be the cubical and Neapolitan parabolæ, the eudoid of the ancients, &c.

But the curve of the first gender (because a right line cannot be reckoned among the curves) is the same with a line of the second order; and a curve of the second gender, the same with a line of the third order; and a line of an infinitesimal order is that which a right line may cut in infinite points; as the spiral, cycloid, the quadratrix, and every line generated by the infinite revolutions of a radius.

However, it is not the equation, but the description, that makes the curve a geometrical one; the circle is a geometrical line, not because it may be expressed by an equation, but because its description is a postulate; and it is not the simplicity of the equation, but the cælein of the description, which is to determine the choice of the lines for the construction of a problem. The equation that expresses a parabola is more simple than that which expresses a circle; and yet the circle, by reason of its more simple construction, is admitted before it.

The circle and the conic sections, if you regard the dimensions of the equations, are of the same order; and yet the circle is not numbered with them in the construction of problems; but by reason of its simple description is preferred to a lower order, viz., that of a right line; so that it is not improper to express that by a circle, which may be expressed by a right line, but it is a fault to construct that by the conic sections, which may be constructed by a circle.

Either, therefore, the law must be taken from the dimensions of equations, as observed in a circle, and so the distinction be taken away between plane and solid problems; or the law must be allowed not to be strictly observed in lines of superior kinds; but that one, by reason of their more simple description may be preferred to others of the same order, and be numbered with lines of inferior orders.

In constructions that are equally geometrical, the most simple are always to be preferred; this law is so universal as to be without exception. But algebraic expressions add nothing to the simplicity of the construction; the bare descriptions of the lines are, where only to be considered; and they alone were considered by the ancients, who joined a circle with a right line. And as there are easy or hard, the construction becomes easy or hard; and therefore it is foreign to the nature of the thing, from any thing else to establish laws about constructions.

Either, therefore, with the ancients, we must exclude all lines beside the circle, and perhaps the conic sections, out of geometry; or admit all according to the simplicity of the description: if the trochoid were admitted into geometry, we might, by its means, divide an angle in any given ratio; would you therefore blame those who would make use of this line to divide an angle in the ratio of one number to another; and contend, that this line was not defined by an equation, but that you must make use of such lines as are defined by equations?

If, when an angle were to be divided, for instance, into 1001 parts, we should be obliged to bring a curve defined by an equation of above a hundred dimensions to do the business; which nobody could describe, much less understand; and should prefer this to the trochoid, which is a line well known, and described easily by the motion of a wheel, or circle: who would not see the absurdity?

Either, therefore, the trochoid is not to be admitted at all in geometry; or else, in the construction of problems, it is to be preferred to all lines of a more difficult description, and the reason is the same for other curves. Hence, the section of an angle by a conchoid, which Archimedes, in his Lemmas, and Pappus, in his Collections, have preferred to the invention of all others in this case, must be allowed to be good; since we must either exclude all lines, besides the circle and right line, out of geometry, or admit them according to the simplicity of their descriptions; in which case the conchoid yields to none except the circle.

Equations are expressions of arithmetical computation, and properly have no place in geometry, except fo far as quantities truly geometrical (that is, lines, surfaces, solids, and proportions) may be said to be equal to others; multiplications, divisions, and such sort of computations, are newly received into geometry, and that apparently contrary to the first design of this science: for whoever considers the construction of problems by a right line and a circle, found by the first geometers, will easily perceive that geometry was introduced that we might expeditiously avoid, by drawing lines, the tediousness of computation.

It should seem, therefore, that the two sciences ought not to be confounded together: the ancients indifferently distinguished them, that they never introduced arithmetical terms into geometry; and the moderns, by confounding both, have lost a great deal of that simplicity, in which the elegance of geometry principally consists. Upon the whole, that is arithmetically more simple, which is determined by more simple equations; but that is geometrically more simple, which is determined by the more simple drawing of lines; and in geometry, that ought to be reckoned best, which is geometrically most simple.

Geometrical Locus, or Place, called also simply locus. See Locus.

Geometrical Medium. See Medium.

Geometrical Method of the Ancients. It is to be observed that the ancients established the higher parts of their geometry on the same principles as the elements of that science, by demonstrations of the same kind; and that they seem to have been careful not to feepose any thing done, till by a previous problem they had shewn how it was to be performed. Far less did they suppose any thing to be done that cannot be conceived, as a line or series to be actually continued to infinity, or a magnitude to be diminished till it becomes infinitely less than what it was. The elements into which they resolved magnitudes were finite, and such as might be conceived to be real. Unbounded liberties have been introduced of late, by which geometry, which ought to be perfectly clear, is filled with mysteries. See Maclaurin's Fluxions, Int. p. 39, sec.

Geometrical Solution. See Curve, Evolvent, and Osculum.

Geometrical Pace, is a measure consisting of five feet. See Pace, and Foot.

Geometrical Plan, in Architecture. See Plan.

Geometrical Plane. See Plane.

Geometrical Proportion. See Geometrical Progression.

Geometrical Proportion, called also absolutely, and simply, proportion, is a humidity or identity of ratios. See Ratio.

Thus, if A be to B, as C to D, they are in geometrical proportion: fo 8, 4, 36, and 15, are geometrical proportions. See Proportion.

Geometrical Solution of a problem, is when the problem is directly solved according to the first principles and rules of geometry, and by lines that are truly geometrical.
The same term is likewise ufed in opposition to all indirect and inadequate kinds of solutions, as by infinite series, &c.

We have no geometrical way of finding the quadrature of the circle, the duplicature of the cube, or two mean proportionals; but mechanical ways, and others, by infinite series, we have.

The ancients, Pappus informs us, in vain endeavoured at the trifecting an angle, and the finding out of two mean proportionals by a right line, and a circle. Afterwards they began to consider the properties of several other lines; as the conchoid, the cissoid, and the conic sections; and by some of these endeavoured to solve those problems. At length, having more thoroughly examined the matter, and the conic sections being received into geometry, they distinguished geometrical problems into three kinds:

1. Plane ones, which, deriving their original from lines on a plane, may be regularly solved by a right line, and a circle.
2. Solid ones, which are solved by lines deriving their original from the consideration of a solid; that is, of a cone.
3. Linear ones, to the solution of which are required lines more compounded.

According to this distinction we are not to solve solid problems by other lines than the conic sections; especially if no other lines but right ones, a circle, and the conic sections, must be received into geometry.

But the moderns, advancing much farther, have received into geometry all lines that can be expressed by equations; and have distinguished, according to the dimensions of the equations, those lines into kinds; and have made it a law, not to construct a problem by a line of superior kind, that may be constructed by one of an inferior kind.

**GEOMETRICAL SQUARE.** See SQUARE.

**GEOMETRICAL TABLE.** See PLAN TABLE.

**GEOMETRICALLY PROPORTIONALS.** See quantities in continual proportion; or which proceed in the same constant ratio; as 6, 12, 24, 48, 96, 192, &c.

They are thus called, in contradistinction to equi-different quantities, which are called, though somewhat improperly, arithmetically proportionals.

**GEOMETRY,** the science, or doctrine of extension, or extended things; that is, of lines, surfaces, or solids.

The word is Greek γεωμετρία, formed of γῆ, γε, earth, and μέτρον, measure; it being the necessity of measuring the earth, and the parts and places thereof, that gave the first occasion to the invention of the principles and rules of this art; which has since been extended and applied to numerous other things; insomuch that geometry, with arithmetic, is now the general foundation of all mathematics.

Herodotus, lib. ii. p. 102, edit. Wicliefmgii, Diodorus, lib. i. § 81, or vol.i. p. 91, edit. Amst. 1746; and Strabo, lib. viii. vol. ii. p. 1130, edit. Amst. 1707, affir. that the Egyptians were the first inventors of geometry; and that the annual inundations of the Nile were the occasion of it; for that river bearing away all the boundary landmarks of men's allotments, and covering the whole face of the country, the people, say they, were obliged to distinguish their lands by the consideration of their figure and quantity; and thus, by experience and habit, formed themselves a method, or art, which was the origin of geometry. A farther contemplation of the draughts of figures, of fields thus laid down, and plotted in proportion, might naturally enough lead them to the discovery of some of their excellent and wonderful properties; which speculation continually improving, the art became gradually improved, as it continues to do to this day. Josephus, however, seems to attribute the invention to the Hebrews: and others, among the ancients, make Mercury the inventor. Polyb. Virgil, De Invent. Lib. i. cap. 18.

From Egypt geometry passed into Greece, being carried thither, as some say, by Cleans; where it was much cultivated and improved by himself. Pythagoras, Anaxagoras, of Clazomene, Hippocrates of Chios, and Plato, who made his acquaintance with the necessity of geometry in order to the successful study of philosophy by the following inscription on the door of his academy, "μαθητήν τοῦ διδάσκαλος μου, θεᾶ, let no one ignorant of geometry enter here." Plato, conceiving that geometry was too mean and restricted an appellation for this science, substituted for it the more extensive name of "Menfuration;" and others have denominated it "Pantometry." Other more general and comprehensive appellations are more suitable to its extent, more especially in the present advanced state of the science; and accordingly some have defined it as the science of inquiring, inventing, and demonstrating all the affections of magnitude. Proclus calls it the knowledge of magnitudes and figures, with their limitations; as also of their ratios, affections, positions, and motions of every kind. About fifty years after Plato, lived Euclid, who collected together all those theorems which had been invented by his predecessors in Egypt and Greece, and digested them into fifteen books, entitled the Elements of Geometry; and those propositions which were not satisfactorily proved, he more accurately demonstrated. (See Euclid.) The importance of these ancient writers, whose works are extant, is Apollonius Pergeus, who flourished in the time of Ptolemy Euergetes, about two hundred and thirty years before Christ, and about a hundred years after Euclid. (See his biographical article.) The third ancient geometer, whose writings remain, is Archimedes of Syracuse, who was famous about the same time with Apollonius. (See Archimedes.) We can only mention Eudoxus of Cnidus, Archytas of Tarentum, Philolaus, Eratosthenes, Aristarchus of Samos, Dinostratus, the inventor of the quadratrix, Menechmus, his brother and the disciple of Plato, the two Arifteus, Conon, Thradeus, Nicoteles, Leon, Theudins, Hermodius, and Nicomedes, the inventor of the conchoid; besides whom, there are many other ancient geometers, to whom this science is indebted.

The Greeks continued their attention to geometry even after they were subdued by the Romans. Whereas the Romans themselves were so little acquainted with this science, even in the most flourishing time of their republic, that they gave the name of mathematicians to their politicians, and formed us, to those who pursued the chimeras of divination and juridical astrology. Nor were they more disposed to cultivate geometry, as we may reasonably imagine, during the decline, and after the fall of the Roman empire. The case was different with the Greeks; among whom we find many excellent geometers since the commencement of the Christian era, and after the translation of the Roman empire. Ptolemy lived under Marcus Aurelius; and we have extant the works of Pappus of Alexandria, who lived in the time of Theodosius; the commentary of Euclides, the Aetabonite, who lived about the year of Christ 530, on Archimedes's
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Archimedes's menurbation of a circle; and the commentary on Euclid, by Proclus, who lived under the empire of Amphilochus.

The consequent inundation of ignorance and barbarism was unavailing to geometry as well as to the other sciences; and those few who applied themselves to this science, &c., were calumniated as magicians. However, in those times of European darkness, the Arabians were distinguished as the guardians and promoters of science; and from the ninth to the fourteenth century they produced many astronomers, geometers, geographers, &c. from whom the mathematical sciences were again received into Spain, Italy, and other parts of Europe, somewhat before the beginning of the 15th century. Some of the earliest writers after this period are Leonardus Pifenus, Lucas Paciolius or de Burgo, and others between 1400 and 1500. After this period appeared many editions of Euclid, or commentaries upon his Elements; e.g. Oronautus Fineus, in 1530, published a commentary on the first five books; as did James Peletarius in 1537; and about the same time Nicholas Tartaglia published a commentary on the whole 15 books. We might here mention other editions or commentaries; such as those of Commandine, Clavius, Dillingly, Schebelinus, Harlins, Dalpambris, Ramus, Herigon, Stevinus, Saville, Barrow, Taucet, Dechales, Figan, Scarabrough, Keill, Cansy, Wills, Mercator, &c. (See Elements.)

At the revival of letters, there were few Europeans capable of translating and commenting on the works of the ancient geometers; and geometry made little progress till the time of Des Cartes, who published his Geometry in 1637. However, not to mention all those who extended geometry beyond its elementary parts, such as Theodorus in his Spheres, Sermius in his sections of the cone and cylinder, Kepler in his Nova Stereometria, &c.; and in 1635, Bonaventure Cavalierius, an Italian of the order of Jesuits, published his "Geometry of Indivisibles." Torricelli his "Opera Geometrica." Viviani, his "Divinationes Geometricae," "Exercitatio Mathematica," "De Locis Solidis," "De Maximis et Minimis," &c.; Viete, his "Effectio Geometrica," &c.; Gregory St. Vincent, in 1647, published his treatise, entitled "Quadratura Circuli & Hyperbolae," a work abounding with excellent theorems and paradoxisms; and Pafcal, about the same time, published his treatise of the cycloids. Geometry, as far as it was capable of deriving aid and improvement from the arithmetic of infinites, was indebted to the labours of Fothermat, Barrow, Newton, Cavalierius, Bruncker, J. Gregory, Huygens, and others, to whom we may add Newton and Leibnitz. (See Planets.) But for Isaac Newton contributed to the progress of pure geometry by his two treatises, "De Quadratura Curvarum," and "Enumeratio Linearum Tertii Ordinis" (see Curve); and still farther by his incomparable and immortal work, entitled "Philosophiae Naturalis Principia Mathematica," which will always be considered as the most extensive and successful application of geometry to physics. We cannot forbear transcribing in this place the compliment paid to this author by the editors of the Encyclopædia, who, considering the various monuments of the author's genius, and that he had made his principal discovery before the age of twenty-four, are tempted, they say, to suberect to the words of Pope, that the sagacity of Newton alloweth even celestial intelligences, and that they contemplate him as a being occupying a kind of middle station between man and themselves; or at least they cannot forbear exclaiming, hanc hominem quidem praedit? what a distance does there subsist between one man and another? The modern geometers are innumerable; and the names of Cotes, Macfarlin, R. Simson, T. Stewart, T. Simpson, &c., not to mention living writers, will always be held in esteem and veneration by those that are devoted to the study of geometry and mathematics. See Elements.

The province of geometry is almost infinite; few of our ideas but may be represented to the imagination by lines, upon which they become of geometrical consideration: it being geometry alone that makes comparisons, and finds the relations of lines.

Astronomy, music, mechanics, and, in a word, all the sciences which consider things susceptible of more and less, i.e. all the precise and accurate sciences, may be referred to geometry; for all speculative truths consisting only in the relations of things, and in the relations between those relations, they may be all referred to lines. Consequences may be drawn from them; and these consequences, again, being rendered tenable by lines, they become permanent objects, which may be constantly exposed to a rigorous attention and examination: and thus we have infinite opportunities both of enquiring into their certainty, and pursuing them farther.

The reason, for instance, why we know to distinctly, and mark so precisely, the concords called octave, fifth, fourth, &c., is that we have learnt to express sounds by lines, i.e. by chords accurately divided; and that we know, that the chord, which sounds octave, is double of that with which it makes a key; that the fifth is the fequalalterate ratio, or as three to two; and fourth, the half. The ear itself cannot judge of sounds with such a nice precision; its judgments are too faint, vague, and variable, to form a science. The finetest-tuned ear cannot distinguish many of the differences of sounds; whence many musicians deny any such differences; as making this sense their judge. Some, for instance, admit no difference between an octave and three dittones; and others, none between the greater and lesser tone; the comma, which is the real difference, is inestimable to them; and much more the schisma, which is only half the comma.

It is only by reason, then, that we learn, that the length of the chord which makes the difference between certain sounds being divisible into several parts, there may be a great number of different sounds contained therein, useful in music, which yet the ear cannot distinguish. Whence it follows, that had it not been for arithmetic and geometry, we should have had no such things as regular fixed music; and that we could only have succeeded in that art by good luck, or force of imagination; i.e. music would not have been any science founded on incontrovertible demonstrations: though we allow, that the times composed by force of genius and imagination, are usually more agreeable to the ear than those composed by rule. So, in mechanics, the heaviness of a weight, and the distance of the centre of that weight from the fulcrum, or point by which it is sustained, being susceptible of plus and minus, they may both be expressed by lines: whence geometry becomes applicable to this science; in virtue of which, infinite discoveries have been made, of the utmost use in life.

Geometrical lines and figures are not only proper to represent to the imagination the relations between magnitudes, or between things susceptible of more and less; as spaces, times, weights, motions, &c. but they may even represent things which the mind can no otherwise conceive, e.g. the relations of incommeasurable magnitudes.

It must be observed, that this use of geometry among the ancients was not strictly scientifical, as among us; but rather symbolical: they did not argue, or deduce things and properties unknown, from lines; but represented or delineated by them things that were known. In effect, they were not united as means or instruments of discovering, but as images or characters, to prefer, or communicate, the discoveries that were already made.
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"The Egyptians," Gale observes, "used geometrical figures, not only to express the generations, mutations, and destructions of bodies; but the manner, attributes, &c. of the spirit of the universe, who, diffusing himself from the centre of his unity, through infinite concentric circles, pervades all bodies, and fills all space. But of all other figures they most affected the circle and triangle; the first, as being the most perfect, simple, and capacious, &c. of all figures: whence Hermes borrowed it to represent the divine nature; defining God to be an intellectual circle or sphere, whose centre is everywhere, and circumference nowhere." See Kirch. Ædip. Egyptiac. and Gale Phil. General lib. ii. cap. 2.

The ancient geometry was confined to very narrow bounds, in comparison of the modern. It only extended to right lines and curves of the first order, or conic sections; whereas in the modern geometry new lines of infinite and higher orders are introduced.

Geometry is commonly divided into four parts, or branches: planimetry, altimetry, longimetry, and stereometry; which see respectively.

Geometry, again, is distinguished into theoretical or speculative, and practical.

The first contemplates the properties of continuity; and demonstrates the truth of general propositions, called theorems.

The second applies those speculations and theorems to particular uses in the solution of problems.

Geometry, speculative, again may be distinguished into elementary and sublime.

Geometry, elementary or common, is that employed in the consideration of right lines, and plane surfaces, and solids generated from them.

Geometry, higher, or sublime, is that employed in the consideration of curve lines, conic sections, and bodies formed of them.

The writers who have cultivated and improved geometry may be distinguished into elementary, practical, and those of the sublimer geometry.

The principal writers of elements, see enumerated under Elements.

Theorems of the higher geometry are Archimedes, in his books De Sphaera, Cylindro, and Cerculi Dimenfione; as also De Spiralibus, Conoidibus, Spharimidibus, De Quadratura Parabolae, and Ararenus: Kepler, in his Geometria Nova; Cavalieri, in his Geometria Indivisibilibus; and Torricellus, De Solidis Spharicis; Pappus Alexandr. in Collectionibus Mathematicis: Paulus Galenus, in his Mechanica and Statices; Barrow, in his Lechiones Geometricae; Huygens, De Cerculi Magnitudine; Bullialdus, De Lineis Spiralibus; Schooten, in his Exercitationes Mathematicae; De Billy, De Proporcionis Harmonicis; Lalo- vera, De Cycloide, For. Er. Com. a P. Habenfein, in Diatome Circulorum; Viviani, in Exerc. Mathematic. de Formatione & Mensura Figurem; Bap. Palmi, in Geomet. Exercitation. and Apoll. Pergamus, De Sectione Rectiorum.

For practical geometry, the fullest and completest treatises are those of Mallet, written in French, but without the demonstrations; and those of Schwenter and Cantzlerus, both in High Dutch. In this class are likewise to be ranked Chavias's: Tresquet's, and Oszan's Practical Geometries; De la Hire's École des Arpenteurs; Reinhold's Geometria; Hartman Beyer's Stereometria; Vogt's Geometria Subterranea; all in High Dutch: Hallius, Galileus, Goldmannus, Schefelt, and Oszan, on the Sector, &c.

The science of geometry is founded on certain axioms, or self-evident truths (see Axiom); it is introduced by definitions of the various objects which it contemplates, and the properties of which it investigates and demonstrates, such as points, lines, angles, figures, surfaces, and solids,—lines again are considered as straight or curved; and in their relation to one another, either as inclined or parallel, or as perpendicular:—angles as right, obtuse, acute, obtuse, external, vertical, &c..—figures, with regard to their various boundaries, as triangles, which are, in respect of their sides, equilateral, isosceles, and scalene, and in reference to their angles, right-angled, obtuse-angled, and acute-angled; as quadrilaterals, which comprehend the parallelogram, including the rectangle and square, the rhombus and rhomboid, and the trapezium and trapezoid; as multilaterals or polygons, comprehending the pentagon, hexagon, heptagon, &c.; and as circles:—and as solids, including a prism, parallelopipedon, cube, pyramid, cylinder, cone, sphere, and the frustum of either of the latter. We shall not here attempt to compile a complete system of geometry, as it would occupy too many of our pages, in a work from its nature protracted and enlarged to a very great extent; and this is the less necessary, because the reader will find under the titles above enumerated, and others naturally connected with and derived from them, the most essential and important principles of geometry, together with the operations that are founded upon them; and because any person who is desirous of acquainting himself with the science of geometry, in its whole extent and application, will have recourse to one or other of those numerous treatises, in a more enlarged or more comprehensive form, which may be easily procured. The Elements of Euclid by Dr. R. Simpfon occur first to our recollection, and deserve particular recommendation; but the object of the geometrical student may be satisfactorily attained by T. Simpson's Geometry, or by the treatises of Emerson, Hutton, Bonycastle, Leslie, &c. &c.

But as the analytic method of treating geometrical questions is less generally known, and as complete treatises on this subject are only to be found in foreign works, we have been induced to devote a considerate space to this part of the science; the following treatise is chiefly compiled from the "Feuilles d'Analyle" by Monge, which were published in separate portions for the use of the polytechnic school, and afterwards collected in a quarto volume. A more elementary work has lately been published by Garnier in octavo, to which the reader is referred.

GEOMETRY, ANALYTIC.—Method of defining the position of a point in a plane.

A point M (Analysis, Plate VIII., fig. 1) is defined by referring its position to two lines, as A Y, A X, generally at right angles to each other, but they may be inclined at any given angle.

If M Q is drawn perpendicular to A Y, and M P perpendicular to A X, then Q M, M P, are called the co-ordinates of the point M; the distance of the point from A Y is usually denoted by x, and its distance from A X by y.

The point of intersection of the two lines A Y, A X is called the origin of the co-ordinates, and the lines A Y, A X, produced each way to Y' and X' are called axes.

If the distance of the point M from these axes is given, viz. M Q = a, M P = b, then x = a, y = b is the equation to the point M.

But if the point M be situated in any other of the angles, the sign of a and b will vary, and these variations are governed by the same rules, as the lines and coines in trigonometry.

For instance, if the point M is situated in the angle Y X A,
The equation of $M'$ is $x = -a$, $y = +b$

$M''$ is $x = +a$, $y = -b$

If the point M is situated on the line $AX$, then $y = c$,

If it is situated on $AY$, then $y = c$; $y = l$, and at the point $A$, $x = a$, $y = 0$.

The point M may likewise be defined by the length of the line $AX$, and by the angle $\varphi$, which it makes with the axis $X$. If this length be expressed by $x$, and the angle by $\varphi$, $x = \cos \varphi$, $\varphi = \lambda$.

$A^2$ being the number of degrees contained in the angle $\varphi$, and $c$ the value of $x$.

The position of a straight line is determined in a plane by the co-ordinates of two of its points, or by the co-ordinates of a single point, and the angle which it makes with one of its axes: the latter is the method most usually employed.

If the line passes through the origin of the axes, its position is determined by the angle which it makes with the axis $X$.

We shall first consider the case as being the most simple. Let it be proposed to determine the relation between the co-ordinates of any point in such a straight line.

Let us take, for example, a point $M'$ (fig. 2) whose abscissa is $A' = x'$, $P'M' = y'$; the co-ordinates, like those of the other points, making an angle $\alpha$ with each other, which is that of the axes, we shall have this equation:

$$y' = \frac{\sin \alpha}{\sin (\alpha - \beta)} x'$$

and for the points $M'$, $M''$, &c. whose co-ordinates would be $x'$, $y'$, $x''$, $y''$, &c. we have

$$y'' = \frac{\sin \alpha}{\sin (\alpha - \beta)} x'' = \frac{\sin \alpha}{\sin (\alpha - \beta)} y''$$

If $x, y$ represent the co-ordinates of any point in $AX$, the general equation will be

$$y = \frac{\sin \alpha}{\sin (\alpha - \beta)} x$$

thus $x$ becoming successively $x'$, $x''$, &c. $y$ changes to the corresponding ordinates $y'$, $y''$, &c. The formula (1) is called the equation of a straight line; it is the algebraic enunciation of a property common to all its points, and is thus written;

$$y = \frac{\sin \alpha}{\sin (\alpha - \beta)} x$$

The abscissa $x$ being given, the ordinate $y$ may be deduced.

When the angle $\alpha$ varies, the line changes its position, turning round the point $A$; thus another ordinate $y$ corresponds to the same abscissa $x$, which also happens if $\alpha$ varies, but it is essential to observe that for all the values both of $\alpha$ and $x$, the equation (2) retains the same form.

If it should be required to find the relation between the co-ordinates of the point of a straight line $P'LI'$, situated in any manner whatever, then if $AL$ be drawn parallel to $R'LI'$, passing through the point $A$, we shall observe that for the same abscissa $x$ every ordinate of $AX$, for example; $P'M$ will be augmented by the same quantity $AR = b$; let $y + b$ be represented by $y$, equation of $R'LI'$ will be according to (2):

$$y = \frac{\sin \alpha}{\sin (\alpha - \beta)} x + b$$

Here $a$ and $b$ give the position of the straight line $R'LI'$; when these quantities are known it may be constructed, but if the line is subject to any particular conditions, as to pass through a given point; or to either parallel or perpendicular to a given line; or to pass through two points, &c. $x$ and $b$ become unknown quantities, as we shall see immediately.

Let us suppose the quantities $a$, $\beta$, and $b$ given, and that it is required to construct the straight line $y = \frac{\sin \alpha}{\sin (\alpha - \beta)} x + b$; the problem is reduced to finding two of these points; we endeavor to find the points in which the line cuts the two axes $AX$, $AY$, (fig. 3,) the intersection $R$ being the only point of the line in which $x = 0$, and $A'$ the only point of the same line in which $y = 0$; we suppose, successively, $x = 0$, $y = 0$, and we shall find $y = b = AR$, $x = \frac{\sin (\alpha - \beta)}{\sin \alpha} b = AR'$; taking, then, $A'R'$ on the other side of the point $A$, if it is negative, and $A R$ on $A Y$ if it is positive, the line drawn through these two points will be that belonging to the equation.

If the equation to a straight line $y = x + 1$ be supposed to refer to two axes, making an angle of $45^\circ$ with each other, and the inclination, $\alpha$, which the line makes with the axis $X$ be required; since $\frac{\sin \alpha}{\sin 45^\circ} = 1$, $\frac{\sin \alpha}{\sin 45^\circ} = \frac{1}{\sqrt{2}}$; hence, $\tan \alpha = \frac{1}{\sqrt{2}}$.

The value of $b$ remaining constant, the line takes every possible position round the point $R$ (fig. 2), for every possible angle from $0$ to $360^\circ$; for every angular value of $\alpha$, taken with every ordinate $b$, positive and negative, the line will pass through every point of the axis $Y$. There exists, therefore, no line in the same plane that cannot be defined by equation (3), provided $b$ and $\alpha$ are taken of a proper value.

The angle $\beta$ has no influence on the position of the line; the variations of this angle only affect the inclination of the ordinate upon the axis of the abscissa; so that for the same abscissa, the ordinate corresponds with another point in the line.

But, in general, the co-ordinates are supposed rectangular; in which case, $\sin \beta = \sin 90^\circ = 1$, and $\sin (\alpha - \beta) = \cos \beta$; and equation (3) becomes $y = x \tan \alpha + b = \alpha x - b$, $a$ being supposed the angle $\alpha$.

When the straight line passes through the origin of the co-ordinates, its equations becomes $y = 0$.

This equation is constructed by taking $AP = 1$ = radius, and then setting off from a scale of equal parts the value of $a$ on the perpendicular $PM$ (fig. 4); $PM$ being equal to $a$, $M$ will be a point in the required line.

We may now construct the equation $y = x + 1$, $y = -x - 1$.

These two lines cut the axis $AX$ in the same point, and are situated similarly to it, one above, the other below; they are moreover perpendicular to each other.

The straight lines $y = -x - 1$, $y = -x + 1$, are parallel, because they make the same angle with the axis, having the same tangent, $-1$.

The straight line expressed by the equation $y = x \sqrt{-1} - 1$ is reduced to a point on the axis $Y$ below the origin, and distant from it by a quantity equal to unity, since, for every other value than zero, the ordinate is imaginary.
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The problems relating to a straight line, in general, require the unknown quantities \(a\) and \(b\) to be determined, so that the required line \(y = ax + b\) (1) may have the required position.

Problem I.

To make a straight line pass through two given points. Let the co-ordinates of one point be \(x', y'\), and of the other \(x'', y''\); which signifies that when the ordinate generally expressed by \(y\) becomes \(y'\), the ordinate becomes \(x'\); and when \(x = x''\), \(y = y''\), we have therefore two equations of condition:

\[ (2) \quad y' = ax' + b, \ y'' = ax'' + b \]  

from whence we obtain

\[ a = \frac{y'' - y'}{x'' - x'}, \quad b = \frac{y' - y''}{x'' - x'} \]

and by substituting for \(a\) its value,

\[ b = \frac{y'' - y'}{x'' - x'} \]

or equation (2) may be subtracted from equation (1), then \(y - y' = a (x - x')\); and substituting for \(a\) in this equation its value, as found above, the equation of the line required is

\[ y - y' = \frac{y'' - y'}{x'' - x'} (x - x') \]  

in which equation we may observe that when \(x\) becomes \(x'\), the second term becomes equal to zero, and \(y = y'\).

If \(y' = y''\), then \(y = y'\), or \(y = y''\), which denotes that the line is parallel to the axis \(AX\).

If \(x' = x''\), \(a = \frac{y'' - y'}{x'' - x'} = \infty\), the angle which the line makes with the axis is in this case a right one.

Problem II.

To determine the distance between two given points in a plane.

The distance \(M' M''\) (fig. 5) is the hypotenuse of the right-angled triangle \(M'M'' m'\); if it be represented by \(D\), then

\[ D = \sqrt{M'M''^2 + M''m'^2} = \sqrt{(y'' - y')^2 + (x'' - x')^2}. \]

If the point \(M\) is at the origin, the co-ordinates \(x', y'\) become nothing, and the preceding expression is reduced to \(D = \sqrt{(y'' - y')^2 + (x'' - x')^2}\) = \(x'' - x'\), because then the equation to the straight line is \(y = ax\); and as this also takes place when \(x = x'', y = y'', \) it gives \(y' = ax''\).

Problem III.

To determine the equation of a straight line that shall pass through a given point, and be parallel to a given straight line.

These two conditions are sufficient to determine the two elements of position for the required straight line.

Let the equation of the given straight line be \(y = ax + b\) (1), and that of the line required \(y = a x + b'\) (2); \(a\) and \(b\) are, in this case, given, and \(a'\) and \(b'\) required. Let \(x', y'\) denote the co-ordinates of the given point; and since this point is in the required line, we have \(y' = a x' + b'\) (3). From equation (1) take equation (3), and \(y - y' = a' (x - x')\) (4).

The same result may be obtained by taking the value of \(b'\) in equation (3), and substituting it in equation (2). Moreover, the two straight lines being parallel, their trigonometric tangents are the same, that is, \(a = a'\); introducing this condition in equation (4), that of the line required will be

\[ y - y' = a (x - x') \]  

Substituting this value of \(y'\) in equation (5), we obtain

\[ y = ax + b \]

which shows that the required line and the given line are identical, which is, indeed, self-evident.

Problem IV.

The equation of two straight lines being given to determine the angle which they make with each other, (fig. 6.) The angles \(\angle A, \angle B\), are given, the angle to be found is \(\angle C\). Put \(C = \alpha, \angle B = \alpha'; \angle C = \beta, \angle A = \beta'; \angle A = \alpha = \beta\); then \(x' = x + V, \) and \(V = a' = \infty, \) or \(\frac{1}{\tan V} = 0; \) therefore \(x' = a' = \infty, \) and \(a' = a\).

Problem V.

To determine the equation of a straight line that shall pass through a given point, and make a given angle with a given straight line. Let the equation of the given line be

\[ y = ax + b \]  

and that required \(y = a' x + b' \) (2); \(a\) and \(b\) are given; whence \(a'\) and \(b'\) are to be determined by the conditions of the problem. Since the required line is to pass through a point whose co-ordinates are \(x', y'\), its equation must satisfy the conditions, that \(x = x', \) and \(y = y', \) hence

\[ y' = a x + b \]  

and consequently

\[ y - y' = a (x - x') \]

\(b'\) being determined from one of the conditions, it remains to determine \(a'\) from the other. Now, \(m\) being the trigonometric tangent of the angle which the two lines make with each other (by Problem IV.), \(m = \frac{a' - a}{1 + a' a}; \) hence \(a' = \frac{a + m}{1 - m a}. \)

Substituting this value of \(a'\) in equation (4), we have the equation required,

\[ y - y' = \frac{a + m}{1 - m a} (x - x') \]  

Problem VI.

To determine the condition under which three lines, drawn from the angles of a triangle, will meet in a single point. Let \(x', y'\) ; \(x'', y''\) be the co-ordinates of the angles \(D, B, C\) (fig. 7.); the equations to the three straight lines drawn from these angles will be \(y - y' = a' (x - x')\); \(y - y'' = a'' (x - x'')\); \(y = y'' = a'' (x - x''); \) \(a', a'', a''\) being the trigonometrical tangents of the angles which they make with the axis \(AX\). For these lines to meet in a point, it is requisite that the same system of values of \(x, y\) should satisfy for the three equations, which is equivalent to the finding the value of \(x\) and \(y\) by means of any two of them, and making the result of their substitution in the third
third equal to zero; we thus find the equation of condition
\[a'(y' - y'') + a''(y'' - y') + a'''(y' - y') + a''''(x' - x'') = 0 (1)\]
and of extremity and \(x''\) which will satisfy this equation (1) suffices.

Let us suppose the required straight lines to be perpendicular
to the sides of the triangle, and then examine if, upon this
supposition, the equation (1) suffices.

The equation to \(B C\) is \(y - y'' = \frac{x'' - x'''}{x'' - x'} (x - x')\); and that of the straight line drawn through \(D\) is \(y - y' = a' (x - x'')\).

Now as this latter straight line should be perpendicular to
the other, the equation \(a' + r = c\), from whence \(a' = - \frac{r}{a}\)
ought to exist between the trigonometrical tangents; but
here \(a = \frac{y'' - y'''}{x'' - x'}\); therefore \(a' = \frac{x'' - x'''}{y'' - y'}\).

The straight line drawn through \(B\) being perpendicular to
\(D C\), we conclude
\[y - y'' = \frac{y - y'''}{x - x'} (x - x'), y - y''' = a'' (x - x'');\]
and the straight line drawn through \(C\) being perpendicular
to \(D B\), we have likewise
\[y - y'' = \frac{y - y'}{x - x'} (x - x'), y - y' = a''' (x - x''');\]
and likewise
\[a'' (x' - x'') = \frac{(x' - x'')(x' - x''')(x' - x''')}{(x' - x') (x' - x'') (x' - x''')} \cdot \frac{y' - y''}{y' - y''} = \frac{N}{D} (y' - y'' + y'' - y' + y''' - y'') = 0 (2).
\]
If the sides \(B C\) be placed on the axes of the
abscissae, which does not alter the general nature of the results,
and also the point \(B\) be placed at \(A\), then \(y'' = c\), \(x'' = c\),
\(y''' = c\), and the equation of condition is simplified, and becomes
\[a'' (x' - x'') + a''' (x' - x''') + a''' (x' - x''') = 0 \Rightarrow (3).\]
In this position of the triangle, \(a' = - \frac{x'' - x'''}{x'' - x'}\) \(y'' - y''' = c \), and in fact the line \(D\) is perpendicular to
\(A X\). If in equation (3) the terms which do not include \(a'\)
be suppressed, to express that the tangent is infinite, the
equation (3) will be simplified, and expressed, thus,
\[a'' (x' - x'') + a''' (x' - x''') = c; \text{ and dividing by } a', a'' (x' - x'') = c; \text{ but in this position of the triangle, we have } a'' = \frac{y'''}{y''} \text{ and } a''' = - \frac{x'''}{y''} \text{ and by these values the preceding equation is satisfied.}\]

If from the points \(A\) and \(C\) lines be drawn to the middle
of the opposite sides, the trigonometrical tangent will be
\[a'' = \frac{y''}{x'' - x'}, a''' = \frac{y'''}{x'' - x'} \text{ The substitution of these values in equation (3) will give, after dividing by } y,\]
\[a' \left\{ \frac{x'}{y'' + y'} + \frac{x''}{y''' + y''} \right\} = \frac{y'' + y'}{y''' + y''} \text{ from which we deduce } a'' = - \frac{2 y''}{y''' + y''} \text{ and as this is found to be the value of } a', \text{ that is, of the trigonometrical tangent of the angle which the line } D \text{ makes with } A X, \text{ it may be concluded that this third line is parallel through the point of intersection of the two first.}\]

Let us consider the perpendiculars drawn from the centres
of the sides of the triangle \(A D C\) (fig. 9), the equation
of \(A D\) is \(y = \frac{y''}{x''} x\); of \(D C, y - y'' = \frac{y''}{x''} (x - x')\);
of \(A C, y = c\).

The equations of the perpendiculars to these sides are:
\[y - \frac{1}{2} y' = - \frac{x'}{y'} (x - \frac{1}{2} x'),\]
\[y - \frac{1}{2} y' = - \frac{x'' - x'''}{y''} \left( \frac{x - x' + x''}{2} \right),\]
\[x = \frac{x''}{2}.\]

The equation of condition may be immediately formed by
determining \(x\) from the two first equations, and employing
this value in the third; which ought to be satisfied by this
substitution if there exits a point of intersection; now \(x\) is
found \(= \frac{x''}{2}\); therefore these three lines intersect in a
point.

Method of determining the Position of a Point in Space.—
Let \(A X, A Y, A Z\), be three straight lines reciprocally
perpendicular to each other (fig. 10) at the point \(A\); each
of them will be perpendicular to the two others, because it
is perpendicular to two straight lines which intersect at its
extremity in this plane. Therefore each of these planes will
be at the same time perpendicular to the two others. These
three planes form then the three faces of a rectangular parallelepiped, and the solid trihedral angle \(A\). Let us suppose
the planes \(Z A X, Z A Y, Y A X\) in real position, for example, before the first plane, to the right
of the second, and above the third; and let us suppose perpendiculars \(M M', M M'', M M''\), from the point \(M\) to
to these three planes; these perpendiculars will measure the
shortest distances from the point to each of these planes.
The planes drawn through the perpendicular \(M M', M M''\),
\(M M''\) and \(M M''\), and the point \(M\) will be the summit of the solid
trihedral angle \(M\) opposite to the angle \(A\).

The distance \(M M'\) from the point \(M\) to the plane \(Z A X\)
is in real length equal to \(M M'\) or \(A M'\); the distance \(M M''\)
from the same point to the plane \(Z A Y\) is \(M M''\) or \(A M''\).
and the distance from this point to the horizontal plane  
Y A X is M M" or M' M or A M'. Thus these distances  
may be found on the fixed lines A Y, A X, A Z.

The points M', M", M'" of the perpendiculars let fall  
from the point M on the planes to which we refer the  
position of this point, are called the vertical and horizontal  
projections of the point M, vertical in considering M' and M",  
and horizontal when considering M'".

Two of these projections are sufficient to determine the  
point; for if from each of them perpendiculars be drawn to  
the plane which contains it, they will intersect in the point  
M.

The third projection evidently results from each of the  
two others, as may be seen in the figure.

Since the position of a point is completely defined by  
its distance from three rectangular planes of projection, if we  
denote the distance of the point from the plane Y A Z by x,  
the distance of the same point from the plane Z A X by y,  
and its distance from the plane Y A X by z, and the linear  
values of these distances be denoted by a, b, c, its position  
will be indicated by x = a, y = b, z = c; the formula  
x = a, y = b, z = c denote the position of the projection M;  
the formula y = b, z = c, denote the projection M' ;  
and the other two projections are sufficient, as we have seen,  
to find the position of the point; and these two syllables  
of formulae comprise the data of the three distances.  
When the point is in the horizontal plane, z = 0, and its position  
is fixed by x = a, y = b; when it is in the plane Z A X,  
y = 0, and its position is determined by x = a, z = c; and  
if in the plane Y A Z we have x = 0, and it is defined  
y = b, z = c.

For a point situated on the axis A X, we have z = 0,  
y = 0, x = a.

If on the axis A Y, z = 0, x = a, y = b; and if on  
A Z, x = 0, y = 0, z = c.

At A, the origin of these distances, we have x = 0,  
y = 0, z = 0.

Every point in the plane, M M', m M'" and consequently  
the plane itself, is denoted by x = a, because a is the common  
distance of each of its points from the plane Y A Z.

The plane M M' m M'" is denoted by y = b, and the  
plane M M" m M'" is described by z = c.

The position of these three planes gives that of the point M,  
and consequently this position will be defined, as we have  
already said, by the formula x = a, y = b, z = c.

Of the Equations of a Straight Line.—The equations of  
a straight line, situated in space, express the relation which  
exists between the co-ordinates x, y, z, of any point whatever  
of the straight line: let us suppose it projected on the  
planes x = 0, and y = 0; these projections will be other  
straight lines, which have for their equations

\[ x = a + \alpha , \quad y = b + \beta ; \]

eliminating z from these equations, the resulting equation  
is \[ b x - a y = \alpha b - \beta a , \]
which belongs to the plane x y.

The equations of these three projections, of which any  
two imply the third, are the equations of the straight line,  
whose position in space depends on the constant quantities  
\( \alpha \), \( \beta \).  

To obtain the co-ordinates of the points in which this  
straight line cuts the three planes, we must make successively  
the three values \( x = 0 \), \( y = 0 \), \( z = 0 \), which gives \( x = \alpha \),  
y = \beta , for the point where the straight line intersects the plane  
x y; \( z = \frac{-\beta}{b} x = \frac{-\alpha}{b} + \alpha \) for the point where it  
intersects x z; \( z = \frac{-\beta}{b} x = \frac{-\alpha}{b} + \beta \) for the point  
where it meets the plane y z.

The straight line, whose equation is \( x = a + \alpha , y = b + \beta \),  
has, with the axes \( x \), \( y \), an angle, whose tangent is \( \theta \): it cuts the  
axis x in a point, whose distance from the origin of the co-  
ordinates is equal \( x \), since, if in this equation \( z = 0 \), \( x = a \).

If two straight lines are situated in the same plane;  
suppose that \( x = a \), \( y = b \); and to the second \( x = a + \alpha , y = b + \beta \);  
for these straight lines to be parallel, \( a \) must = \( a \), and, if perpendicular,  
\[ 1 + a a' = 0 \text{ or } a a' = \frac{1}{a}. \]

The equation of two straight lines, situated in space,  
being, for the first,

\[ x = a + \alpha , \quad y = b + \beta ; \]

\[ x = a + \alpha , \quad y = b + \beta ; \]

the equation, which expresses that these lines meet each other,  
is \( (x - \alpha) (y - b) = (b - b) \), which results  
from the elimination of \( x, y, z \), from the four equations  
of the two straight lines.

Problems relating to a Straight Line.—Prob. I. To draw  
a straight line through a point given in space parallel to  
a given straight line. Let the three rectangular co-ordinates  
be \( x, y, z \); \( z \) being first supposed vertical; and let the  
equations of the projections of the straight line on the  
vertical planes be \( x = a + b, y = a + b + \beta \); then the equation  
of the horizontal projection will be \( y = y' = a (y - y') \)

\[ (\text{of any two imply the third}). \]

Prob. II.

To determine the equation of a straight line drawn  
through two points given in space. Let \( x', y', z' \), be the  
co-ordinates of the first point; \( x'', y'', z'' \), the co-ordinates of the second,  
the straight line passing through the first point, its equations  
will be of the form

\[ x = a' = a (z - z') \quad y = y' = b (z - z') \]

(See Prob. I. of the plane.)

And since it must pass through the second, its equations  
must also be

\[ x = a'' = a (z - z'') \quad y = y'' = b (z - z'') \]

\( a \) and \( b \) being eliminated from their equations, the four equations  
of the required straight line will be

\[ x (x' - z') + (x' - y') (z' - z'') \]

\[ y (z - z') = z (z' - y') + y'' z'' \]

The co-ordinates of the two extremities of a right line  
being \( x', y', z' \), for the first, and \( x'', y'', z'' \), for the second,  
the distance between the extremities, or length of the line  
joining them, will be

\[ \sqrt{(x' - x'')^2 + (y' - y'')^2 + (z' - z'')} \]

Prob. III.

To determine the conditions requisite for two straight  
lines to meet in space. Let the equations of one straight  
line be

\[ x = a + \alpha \]

\[ y = b + \beta \]

and of the other

\[ x = a + \alpha' \]

\[ y = b + \beta' \]

T. 

GEOMETRY.
GEOMETRY.

To determine the relation between the elements of position $x, y, z$ of a point, $x', y', z'$ of the same point, and the co-ordinates $a, b, c$ of the plane on which it lies, we eliminate $x, y, z$ from the four equations, and $(a' - a) (b' - b) - (b' - b) (c' - c) = 0$.

The condition for parallelism is expressed by the equations $a = a', b = b'$.

**Problem I.**

Problems relating to a straight line and a plane.—To draw a plane parallel to a given plane, let the equation to the given plane be

$$z = a x + b y + c$$

and that of the plane required

$$z = a' x + b' y + c'$$

then the condition of parallelism will be

$$a = a', b = b'.$$

**Problem II.**

To determine the equation of a plane which shall pass through three given points, let the co-ordinates of the given points be $1, 2, 3$, the three following conditions are obtained:

$$A x + B y + C z + D = 0$$

from which are deduced the following equations:

$$A = (y' - y'') (z'' - z') + (z' - z'') (x' - x'),$$

$$B = (x' - x'') (z'' - z') + (z' - z'') (y' - y'),$$

$$C = (x' - x'') (y'' - y') + (y' - y'') (x' - x').$$

The three co-efficients to determine are $A, B, C, D$ from the three equations.

If the triangle formed by the straight lines joining the given points be projected on the three planes $x, y, z$, the areas of these respective projections will be $A, B, C$, and it will be shown that $D$ is the area of the solid of a pyramid whose base is the triangle in space, and whose vertex is the origin of the co-ordinates.

Let a triangle, as $x'y'z'$, represent the projections of the above three points on the plane $x, y, z$, the area of the trapezium $x'' x' y'' z''$ will be $\frac{1}{2} (x'' - x') (y'' - y')$.

The area of the trapezium $x'' y'' x' z''$ will be $\frac{1}{2} (y'' - y') (z'' - z')$.

and that of the trapezium $x' y' x'' z''$ will be $\frac{1}{2} (z'' - z') (x'' - x')$.

From the sum of the two first surfaces, take the left, the difference will be the area of the triangle projected on the plane $x, y, z$, which will be $t = \frac{1}{2} A + B + C$.

In the same manner, $t$ and $t''$ representing the projections of the same triangle on the planes $y, z, x$, we have

$$t = \frac{1}{2} A, t'' = \frac{1}{2} C.$$

**Problem III.**

Given the co-ordinates of a point, and the equation of a straight line, to find the equation of the plane which passes through the straight line and the given point, let $x', y', z'$ be the co-ordinates of the point:

$$\begin{cases} x = a x' + b y' + c \\ y = b z' + \beta \\ z = (x - \alpha) = \gamma (y - \beta) \end{cases}$$

be the equations of the line.
GEOMETRY.

Then since the plane, whose equation is required, passes through the given point, and likewise through the point where the given line intersects the plane \(xy\), the co-ordinates to which points are \(z = c\), \(x = a\), \(y = b\). If the equation to the plane be supposed

\[ z = Ax + By + D, \]

in which \(A, B, D\), are co-efficients to be determined, then

\[ z' = A'x' + B'y' + D'. \]

Now the right lines being in the plane, suppose them both moved parallel to themselves till the plane passes through the origin of the co-ordinates, the equations there will be, for the straight line,

\[ x = ax, \quad y = bz, \quad ay = bx \]

and for the plane \(x = A'x + B'y\).

In this position the line is still in the plane, so that their co-ordinates are still the same; therefore,

\[ z = Ax + Bz, \quad 1 = A + B. \]

The equations 1, 2, 3, will give \(A, B, D\) in terms of \(x, y, z\), and the equation of the plane will be

\[ (x - a)x' - b)z' - \beta) = (y - b)(y' - \beta) \]

\[ + (z - z) = (a + c) \]

PROBLEME IV.

Given the equations of a straight line, and of a plane to determine the conditions; 1st, that the plane and straight line may be rectangular; 2d. The co-ordinates of the points where they meet; 3d. The distance of this point from a given point, either in the given line or given plane.

When a plane is perpendicular to a straight line, the intersection of the plane with the co-ordinates planes and the projection of the line with these same planes are perpendicular to each other.

Let \(x = ax + a_1, y = bz + b_1\) be the equations to the line; \(z = Ax + A_1, y = C_1\) to the plane; the equations to the intersections of this plane with the rectangular planes of \(ax, y\), are \(z = Ax + A_1, y = C_1\); but the plane being perpendicular to the line is \(A = -a, B = -b\); therefore the equation of a plane perpendicular to the line, is \(x + by + z = C\); combining this equation with those of the straight line \(x = ax + a_1, y = bz + b_1\) we may deduce the values of \(a, b, z\) the co-ordinates of the point in which the straight line intersects the plane. If the plane is given by the equation \(ax + by + z = C\), and the perpendicular to it be required to be drawn through a point whose co-ordinates are \(x, y, z\), the equation to this perpendicular will be \(x - x' = a(z - z)\), etc., \(y - y' = b(z - z)\); and the equation to the plane may be expressed in this form

\[ a(x - x') + b(y - y') + c(z - z) = C - a'x' - b'y' - z'. \]

Let \(x, y, z\) be the co-ordinates of the point of intersection of the plane and perpendicular, then

\[ z = z' + \frac{C - a'x' - b'y' - z'}{1 + a + b} \]

\[ Z = y' + \frac{b(C - a'x' - b'y' - z')}{1 + a + b} \]

\[ X = a(C - a'x' - b'y' - z') \]

The length of the perpendicular comprised between the points \(X, Y, Z\) and the points \(x', y', z'\) is

\[ \sqrt{(X - x')^2 + (Y - y')^2 + (Z - z')^2} \]

\[ = \frac{C - a'x' - b'y' - z'}{\sqrt{1 + a + b}^2}. \]

Hence it follows that the perpendicular drawn from the origin of the co-ordinates upon a plane whose equation is

\[ ax + by + z = C \]

is expressed by

\[ \frac{C}{\sqrt{1 + a^2 + b^2}} \]

Having the equations of a straight line \(\begin{cases} x = a + a' + \beta \frac{a}{\sqrt{1 + a^2 + b^2}} \\
y = b + b' + \beta \frac{b}{\sqrt{1 + a^2 + b^2}} \end{cases} \)

the equation of a plane perpendicular to this line drawn through the point \(x', y', z'\) is

\[ a(x - x') + b(y - y') + c(z - z') = 0. \]

To find the co-ordinates of the point of intersection of the plane, the equations of the straight line may be put under the following form:

\[ x - x' = a + x - x' \]

\[ y - y' = b + y - y' \]

Let \(X', Y', Z'\) be the co-ordinates of the points of intersection; then

\[ Z = a(x = a) + b(y - y') + c(z = c) \]

\[ Y = b(x - x') + b(y - y') + c(z - z') \]

\[ X = a(x - x') + b(y - y') + c(z - z') \]

Substituting for \(X', Y', Z'\) their values in the radical

\[ \sqrt{(X - x')^2 + (Y - y')^2 + (Z - z')^2} \]

an expression is obtained for the perpendicular contained between the given point of the straight line, of which the co-ordinates are \(X, Y, Z\). When the straight line passes through the origin of the co-ordinates, its equations become \(x = a, y = b, z = c\), and the radical

\[ \sqrt{X'^2 + Y'^2 + Z'^2} \]

expresses the length of the straight line, drawn from the origin of its coordinates to its intersection with the perpendicular let fall from the point \(x', y', z'\), upon it; then upon this supposition \(x = a, y = b, z = c\) and

\[ Z' = a(x + b(y + c) + z) \]

\[ Y' = b(z') \]

\[ X' = a(z') \]

therefore

\[ \sqrt{X'^2 + Y'^2 + Z'^2} = \sqrt{a + b + c} \]

This expression is used in finding the angle which two straight lines make with each other.

4. The equation of two straight lines being given to find the angle which they make with each other, and if they do not intersect each other to determine the angle which their projections form on a plane that is parallel to them; let the equations of the given lines be

1st. \(\begin{cases} x = a + a' \\
y = b + b' \end{cases} \)

2d. \(\begin{cases} x = a + a' \\
y = b + b' \end{cases} \)

If they intersect, the angle which they make is equal to the angle formed by their parallels which pass through the origin of the co-ordinates; the equations to their parallels being \(\begin{cases} x = ax, y = by \end{cases} \). If a point be taken on the second parallel, whose co-ordinates are \(x', y', z'\), and a perpendicular be let fall from this point to the first parallel; then in the right-angled triangle formed by this perpendicular, and by the straight lines drawn from the origin of the co-ordinates to the two extremities of this perpendicular, there are given the two sides which contain the required angle; the expression for one of these sides is

\[ \sqrt{a^2 + b^2} \]
\[ \sqrt{x'' + y'' + z''}, \] the other, as found in the preceding problem, is \[ \frac{a x' + b y' + z'}{\sqrt{1 + a^2 + b^2}}. \]

Therefore the cosine of the required angle is equal to
\[ \frac{a x' + b y' + z'}{\sqrt{1 + a^2 + b^2}} \times \frac{v = a z', y = b z'}{\sqrt{1 + a^2 + b^2} \times \sqrt{v^2 + y^2 + z^2}}. \]

But \( v = a z', y = b z' \); therefore the cosine of the angle formed by the two given straight lines
\[ \frac{1 + a d' + b b'}{\sqrt{1 + a^2 + b^2} \times \sqrt{1 + a^2 + b^2}}. \]

It appears from this expression, that when two straight lines have for their equations
\[
\begin{align*}
1 & \quad x = a z, y = b z, \\
2 & \quad x = a' z, y = b z,
\end{align*}
\]

if they are perpendicular to each other, the following equation of condition will be obtained, \( 1 + a d' + b b' = 0 \), which equation may be likewise obtained directly as follows: the plane perpendicular to the first line drawn through the origin of the co-ordinates, has for its equation \( a x + b y + z = 0 \). But the perpendicular to the first straight line must be contained in the plane perpendicular to it; therefore the equations to the perpendicular \( x = a z', y = b z' \), and the equation of the plane must fulfills at the same time; therefore \( 1 + a d' + b b' = 0 \). The angle of the two planes may be thus determined. Let \( a x + b y + z = C \), \( a' x + b' y + z = C' \) be the equations of the planes; these make with each other the same angle as the straight lines which are perpendicular to them, and which are drawn from the origin of the co-ordinates; therefore the cosine of the angle formed by the given planes, is
\[ \frac{1 + a d' + b b'}{\sqrt{1 + a^2 + b^2} \times \sqrt{1 + a^2 + b^2}}. \]

If the angle be required between one straight line and one plane, then suppose a parallel drawn to the given lines through the origin of the ordinates, and a perpendicular to the plane, the angle contained between these two straight lines will be the complement of the required angle; and consequently, the cosine of the angle of the two lines is the sine of the angle required.

The straight line, whose equations are \( x = a z, y = b z \), makes with the axes \( x, y, z \), angles whose cosines are
\[
\begin{align*}
\sqrt{\frac{x^2 + y^2 + z^2}{a^2 + b^2}} & \quad \sqrt{\frac{a^2 + b^2}{1}} & \quad \sqrt{\frac{a^2 + b^2}{1}} & \quad \sqrt{\frac{x^2 + y^2 + z^2}{a^2 + b^2}}.
\end{align*}
\]

\( a x + b y + z = 0 \) be the equation of the plane; \( a x + b y + z = C \), \( a' x + b' y + z = C' \) be the equations of the planes; these make with each other the same angle as the straight lines which are perpendicular to them, and which are drawn from the origin of the co-ordinates; therefore the cosine of the angle formed by the given co-ordinates, planes, then \( t = \frac{1}{2} A, t' = \frac{1}{2} B, t'' = \frac{1}{2} C \); \( D \)

being the solidity of a pyramid which has for its base the triangle \( T \), and whose vertex is the origin of the co-ordinates. Now the solidity of this pyramid is the product of the base

\( T \), by one third of its height \( \frac{\sqrt{A^2 + B^2 + C^2}}{6} \); therefore
\[ \frac{D}{6} = \frac{T}{3} \times \frac{\sqrt{A^2 + B^2 + C^2}}{6}, \]

or substituting for \( A, B, C \) their values \( 2 t, 2 t', 2 t'' \), \( T' = t' + t + t'' \).

If \( s \) be the area of another triangle whose projections are \( x', y', z' \), and situated in the same plane as the triangle \( T \); then
\[ \frac{s}{2} = \frac{s'}{2} + s'' \]

Since \( T = \frac{1}{2} \sqrt{A^2 + B^2 + C^2} \), \( T = \frac{1}{2} \sqrt{A^2 + B^2 + C^2} \), \( T'' = \frac{1}{2} \sqrt{A^2 + B^2 + C^2} \), which signifies that any triangle is

to its projection on one of the co-ordinate planes, as radius is to the cosine of the angle which the plane of the triangle makes with the plane on which it is projected.

But the triangle \( S \) being in the same plane with the triangle \( T \),
\[ \frac{t}{s} = \frac{t'}{s''} = \frac{t''}{s''}, \]

therefore if the equation \( T' = t' + t'' + t''' \), be put under this form, \( T = \frac{t}{s} \times t + \frac{t'}{s'} t' + \frac{t''}{s''} t'' \); it will become
\[ T = t + t' + t'' \]

T' \( s + s' + s'' \); but \( T' = T + T' s + T'' s'' \). If \( T' = t'' + t'' t' t'' t'' \); therefore \( (T' + S)^2 = (t + t' + t'')^2 \); hence if any plane figure whatever be projected on three rectangular planes, the square of the area of this figure will be equal to the sum of the squares of the areas of its three projections.

\section*{Problem V.}

Two straight lines being given, to determine the equations to a straight line perpendicular to each of them on which their shortest distance is measured; \( z \); to find an expression for this shortest distance.

The direction of a plane parallel to two straight lines given in position may be determined: this plane being drawn through any point in space, we may conceive a plane to pass through each of the straight lines perpendicular to it: the intersection of these two planes is evident the line required, therefore the equations to these planes will be those of the line required.

Let \( x = a z + z, y = b z + z, \) be the equations to the first line, it will meet the plane \( x y \) in a point \( P \), of which the co-ordinates are \( z = \alpha, y = \beta, x = \alpha \).

The second straight line having for its equations \( x = a' z + a', y = b' z + b', \) it meets the plane \( x y \) in a point \( P' \), whose co-ordinates are \( z = \alpha, y = \beta, x = \alpha \).

The equations of the planes drawn through the points \( P \) and \( P' \) parallel to the two given straight lines are of the form
\[ \frac{1}{2} \Lambda (x - \alpha), \]
\[ A (x - a) + B (y - b) + z = 0 \quad \text{(a)} \]
\[ A (x - a') + B (y - b') + z = 0 \quad \text{(c')} \]

A and B being two constant quantities determinable by the following equations

1. \[ a + A a + B b = 0 \]
2. \[ b - b' = 0 \]
3. \[ A = \frac{a - a'}{a b - a' b'} \]
4. \[ B = \frac{a - a'}{a b - a' b'} \]

The perpendiculars to these parallel planes drawn through the points \( P_1, P_2 \) have their equations

1. \[ x - a = z + \alpha \quad y = B z + \beta \]
2. \[ x - a' = z + \alpha' \quad y = B z + \beta' \]

The plane drawn through the first of these perpendiculars, and the first given line, has for its equation

\[ L (x - a) + M (y - b) + z = 0 \quad \text{(E)} \]

L and M being given by the two equations

1. \[ i + L A + M B = 0 \quad \text{(3)} \]
2. \[ i + L a + M b = 0 \quad \text{(4)} \]

The equation of the plane drawn through the second perpendicular, and the second straight line is

\[ L' (x - a') + M' (y - b') + z = 0 \quad \text{(E')} \]

\[ L' \text{ and } M' \text{ being determinable by these equations} \]

1. \[ i + L' A + M' B = 0 \]
2. \[ i + L' a' + M' b' = 0 \]

Now each of these last planes contains the required line, therefore the equations of their line of intersection will be those required.

The equations (1) (2) give the values of A and B, and combining them with equations (3) (4) the following values are obtained for \( L, L', M, M' \):

\[ L = \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \]
\[ L' = \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \]
\[ M = \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \]
\[ M' = \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \]

Substituting these values in equations (E) (E') we have

\[ (\alpha - \alpha) \left\{ \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \right\} + (y - \beta) \left\{ \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \right\} = 0 \]
\[ (x - a') \left\{ \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \right\} = 0 \]

\[ b - b' = \left\{ \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \right\} + \left\{ \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \right\} \]
\[ (b - b') = 0 \]

Substituting these values in the equations of the line (E) (E') we have

\[ \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \]
\[ A = \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \]
\[ B = \frac{a - a'}{a b - a' b'} + \frac{b (a b - a' b')}{a (a - a') + b (b' - b)} \]

The values of the new co-ordinates will be

\[ \alpha = A x + B y + C z + D \]
\[ \beta = A' x + B' y + C' z + D' \]

The three planes intercept each other two by two in three straight lines which are the new axes. The new co-ordinates of the point are measured on the lines drawn through this point parallel to the new axes. The length of any one of these co-ordinates is the part of one of these lines contained between the point, and the plane of the co-ordinates to which this line is parallel.

Let \( x_1, y_1, z_1 \) be the co-ordinates of the point in relation to the primitive planes, and \( a, b, c \) its co-ordinates in relation to the three new planes.

For conciseness let

\[ L' = \frac{(C'B' - C'B') + (A'C' - A'C') + (B'A' - B'A')}{(B'A' - B'A')^2} \]
\[ L'' = \frac{(C'B' - C'B') + (A'C' - A'C') + (B'A' - B'A')}{(B'A' - B'A')^2} \]
\[ L''' = \frac{(C'B' - C'B') + (A'C' - A'C') + (B'A' - B'A')}{(B'A' - B'A')^2} \]

The values of these new co-ordinates will be

\[ u = \frac{A x + B y + C z + D}{L} \]
\[ v = \frac{A' x + B' y + C' z + D'}{L'} \]
\[ w = \frac{A'' x + B'' y + C'' z + D''}{L''} \]

If the three new planes be supposed perpendicular to each other, then \( A A' + B B' + C C' = 0 \), \( A A'' + B B'' + C C'' = 0 \), which is the case of each point in the plane of the new co-ordinates.

Multiplying the first of these three equations by \( B' \), the second by \( B'' \), and subtracting, we have

\[ C (B'B'' - B''B') = 0 \]

and

\[ A (A'A'' - A''A') = 0 \]

Multiplying the first by \( A' \), the second by \( A'' \), and subtracting, we have

\[ B (B'B'' - B''B') = 0 \]

and

\[ A (A'A'' - A''A') = 0 \]

The values of the new co-ordinates will be

\[ u = \frac{A x + B y + C z + D}{L} \]
\[ v = \frac{A' x + B' y + C' z + D'}{L'} \]
\[ w = \frac{A'' x + B'' y + C'' z + D''}{L''} \]
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A (A'C'' - A'' C) - B (C'B'' - C'' B') = o.

By means of the three equations the expression for L is reduced to \( \sqrt{A^2 + B + C^2} \).

By a similar calculation,

\[ L' = \sqrt{A'v^2 + B'^2 + C'^2}; \quad L'' = \sqrt{A''v^2 + B''^2 + C''^2}; \]

which gives for the new co-ordinates \( u, v, w \),

\[ u = A x + B y + C z + D \div \sqrt{A^2 + B + C^2}; \]
\[ v = A' x + B' y + C' z + D' \div \sqrt{A'^2 + B'^2 + C'^2}; \]
\[ w = A'' v + B'' y + C'' z + D'' \div \sqrt{A''^2 + B''^2 + C''^2}. \]

The values of \( u, v, w \), might have been determined directly, since they are the perpendiculars drawn from the points \( x, y, z \), upon three planes, whose equations are known.

If it be required to transform one system of rectangular co-ordinates into another system likewise rectangular, and having the same origin as the first, the three new axes may be given by the equations of the three new rectangular planes. Of the six constant quantities which enter these equations, three are determined by the condition that the planes are perpendicular to each other, and their values are to be calculated from that which is afforded to the other three; but this calculation may be avoided by determining the position of the new axes by means of any three angles, \( x, y, z \). This transformation is useful in the application of analysis to mechanics. The following method is that used by La Place in the "Mechanique celeste."

Let the primitive planes be designated by two of the three co-ordinates \( x, y, z \), which they contain, and the new planes by two of the co-ordinates \( x', y', z' \).

Let \( x \) be the angle of the two planes \( x, y \) and \( x, y' \).

\( \theta \) the angle which the axis \( x \) makes with the line of intersection of the plane \( x = y' \) with the plane \( x = y \).

\( \gamma \) the angle which this line makes with the axis \( x' \).

It is now required to find the values of \( x', y', z' \), in terms of \( x, y, z \), and of the three angles \( x, y, z \).

Let \( x', y', z' \), be the co-ordinates of a point referred to the rectangular axes, reckoned upon the three following lines.

1. The line of intersection of the plane \( x = y' \) with the plane \( x = y \).

2. The projection of the axis \( z' \) on the plane \( x, y \).

3. The axis \( z' \); then

\[ x = x' \text{ cof. } \downarrow + y' \text{ fin. } \downarrow \]
\[ y = y' \text{ cof. } \downarrow = x' \text{ fin. } \downarrow \]
\[ z = z'. \]

Let \( x', y', z' \), be the co-ordinates of a point referred to the rectangular axes, reckoned upon the three following lines; 1. The line of intersection of the plane \( x' = y' \) with that of \( x = y \). 2. The perpendicular to this line on the plane \( x' = y' \). 3. The angle \( x' \), then

\[ x' = x'' \]
\[ y' = y'' \text{ cof. } \downarrow + y'' \text{ fin. } \downarrow \]
\[ z' = z'' \text{ cof. } \downarrow = y'' \text{ fin. } \downarrow \]

\[ z'', y'', z'' \] being the co-ordinates of the point relative to the three axes \( x'', y'', z'' \), we have

\[ x'' = x'' \text{ cof. } \downarrow + y'' \text{ fin. } \downarrow \]
\[ y'' = y'' \text{ cof. } \downarrow + z'' \text{ fin. } \downarrow \]
\[ z'' = z'' \text{ cof. } \downarrow + y'' \text{ fin. } \downarrow \]

Hence \( x = x'' \) \text{ cof. } \downarrow + y'' \text{ fin. } \downarrow + \text{ cof. } \downarrow + \text{ cof. } \downarrow \)
\[ y = y'' \text{ cof. } \downarrow + z'' \text{ fin. } \downarrow + z'' \text{ fin. } \downarrow + \text{ cof. } \downarrow + \text{ cof. } \downarrow \]
\[ z = z'' \text{ cof. } \downarrow + y'' \text{ fin. } \downarrow + \text{ cof. } \downarrow - x'' \text{ fin. } \downarrow \]

Multiplying these values of \( x', y', z' \), respectively by the coefficients of \( x'', y'', z'' \) in these values, we have

\[ x'' = \left\{ x (\text{ cof. } \downarrow \text{ fin. } \downarrow + \text{ cof. } \downarrow \text{ cof. } \downarrow) + y (\text{ cof. } \downarrow \text{ fin. } \downarrow + \text{ cof. } \downarrow \text{ cof. } \downarrow) + z (\text{ fin. } \downarrow \text{ cof. } \downarrow + \text{ cof. } \downarrow \text{ cof. } \downarrow) \right\} \]

And by multiplying these values of \( x, y, z \) respectively by the coefficients of \( x'', y'', z'' \), and afterwards by the coefficients of \( x', y', z' \), we have

\[ z'' = x (\text{ cof. } \downarrow \text{ fin. } \downarrow + \text{ cof. } \downarrow \text{ cof. } \downarrow) + y (\text{ cof. } \downarrow \text{ fin. } \downarrow + \text{ cof. } \downarrow \text{ cof. } \downarrow) + z (\text{ fin. } \downarrow \text{ cof. } \downarrow + \text{ cof. } \downarrow \text{ cof. } \downarrow) \]

Another transformation is sometimes used; a point being referred to three rectangular planes by the co-ordinates \( x, y, z \), a straight line is drawn from this point to the origin of the co-ordinates; the length of this line is given, as likewise the angles which it makes with the three rectangular axes. If \( r \) represent this line, and \( x, y, z \), the three angles, then \( r = r \text{ cof. } x + r \text{ cof. } y + r \text{ cof. } z = r \text{ cof. } \gamma \).

Of these three angles two only are necessary; because

\[ \text{cof. } x^2 + \text{cof. } y^2 + \text{cof. } z^2 = 1. \]

When the position of a point is thus determined by a line \( r \) and two angles, \( r \) is called the radius vector, and the origin of the co-ordinates becomes a pole, from which proceeds the radius vector of different points in space.

Sometimes the radius vector is projected upon one of the rectangular planes, suppose on \( x \); the angle of the radius, with its projection, is given, as likewise the angle of the projection with the axis of \( x, y, z \); if \( \gamma \) represent the first, and \( \delta \) the second of these angles,

\[ z = r \text{ fin. } \downarrow + y = r \text{ fin. } \downarrow \text{ fin. } \downarrow + x = r \text{ fin. } \gamma \text{ cof. } \downarrow. \]

If the point, referred to three rectangular planes by the co-ordinates \( x, y, z \), belongs to a surface, we have between these three co-ordinates an equation, \( F (x, y, z) = 0 \). If the co-ordinates are transformed, and the new ones become \( u, v, w \), we must substitute in \( F = o \) for \( x, y, z \); their values in terms of \( u, v, w \), and the resulting equation will belong to the new surface referred to the new planes.

If in the equation \( F = o \), for \( x, y, z \), we substitute the values given in equations \((1)\) and \((2)\), it will become what is termed the polar equation to this surface.

When a curve is given by two equations \( f (x, y, z) = o \), \( f (x, y, z) = o \), substituting in these equations the values given by equation \( F (x, y, z) = o \), we obtain an equation to the curve, relating either to three new planes by the co-ordinates \( u, v, w \); or to a pole, by the radii vectors, and their angles.

Of the centres of surfaces, and of their diametral planes. 

The centre of a surface is defined to be a point, in which all the chords passing through this point are divided into two equal parts.

A diametral plane is that which divides a system of parallel chords, each into equal parts.

Hence, if a surface has a centre, all the diametral planes which it can have, necessarily pass through this centre.

Having given the algebraic equation of a surface, to determine 1st, if it has a centre; 2d, if it has a diametral plane.

If the proposed surface has a centre, let it be referred to three planes, the origin of whose co-ordinates is the centre itself.

Any straight line drawn through the origin of these co-ordinates will be a diameter, and will cut the surface in two points, the co-ordinates of the first being \( x, y, z \), and of the second \( -x, -y, -z \). Therefore, the equation to the surface must fulfill in taking \( x, y, z \), positive or negative; to satisfy this condition, the sum of the exponents of the three co-ordinates in every form must be the same in every party as the number which expresses the degree of the equation proposed, that is, if even, even, if odd, odd.
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if \( \zeta \) be the equation to the surface referred to, any three planes, then, in this equation make

\[ r = x + a_1 x = y + b_1 x = z + c_1 x; \]

and an equation of the surface will be obtained in terms of \( x, y, z \) referred to three new planes parallel to the first, and passing through the point suppoled to be the centre of the surface: if, by the three particular values assigned to \( a_1, b_1, c_1 \), the terms may be made to disappear, in which the sum of the exponents of the three co-ordinates are of a different denomination as to even or odd, then the degree or dimension of the equation \( \zeta, r, s, \) the proposed surface will have a centre.

Of Diametral Planes.—When, in all the terms of an equation of a surface, the exponent of one of the co-ordinates is an even number, the plane of each of the other co-ordinates divides the surface into two equal and similar parts.

The equation being \( \zeta = z, x, y, z \) if in all its terms the exponent of \( z \) is an even number, the plane of \( x \) and \( y \) will be a diametral, for it will give for \( z \) a value \( \infty \), function of \( x, y \), and constant quantities, and \( z = \infty \) will satisfy this equation; therefore, to the same values of \( x, y \), two values of \( z \) will correspond, differing only in the sign; therefore the plane of \( x, y \) will be diametral, and for the reason the two other planes of the co-ordinates will be diametral; when in each term the exponents of \( x, y \) are even numbers.

Let \( \zeta \) be the equation of the proposed surface; by the transformation of the ordinate, the surface may be referred to three new planes, then \( A r + B x + C z + D = \infty; A' r + B' x + C' z + D' = \infty; A'' r + B'' x + C'' z + D'' = \infty \); in which equation there are nine constant quantities.

The surface proposed has diametral planes, when, by affiging real and particular values to these constant quantities, the terms in which the exponents of the co-ordinates which are odd numbers, may be made to disappear. The real root of the equation, obtained by making the co-efficients of these terms equal zero, determines the number of diametral planes.

In considering surfaces of the second degree, great use may be made of these principles, in determining the centres and diametral planes of these surfaces.

Of Surfaces of the Second Degree.—Let the general equation of the second degree, between three variables \( x, y, z \), be \( a x^2 + b y^2 + c z^2 + d x y + e x z + f y z + g x + h y + k z + l = \infty \). To determine if the surface to which this equation belongs has a centre.

Making \( x = \beta + x, y = \gamma + y, z = \delta + z, \) \( x, y, z \) being suppoled the co-ordinates of the center, the equation becomes \( a' x^2 + b' y^2 + c' z^2 + d' x y + e' x z + f' y z + g' x + h' y + k' z + l' = 0 \).

In this equation, which is likewise the equation of the second degree, there are only three terms in which the sum of the exponents of the co-ordinates is an odd number; these terms may be made to disappear, by making their co-efficients equal to zero, which gives \( g' = 0; b' = 0; \delta = 0; \) making this substitution and taking only the terms multiplied by \( x, y, z \), the equation becomes \( x + y + z + g = 0; b + d + e + \gamma + b = 0; \delta + e + f + \gamma + k = 0 \).

These equations being linear in \( \beta, \gamma, \delta \), these quantities have real values; therefore, surfaces of the second degree have a centre.

If a certain relation be established between the constant quantities \( a, b, c, d, e, \) etc, this centre may be placed at an infinite distance from the origin of the co-ordinates. In effect, the value of \( x, y, z \) are fractions whose common denominator \( a x^2 + b f^2 + c d + \delta a b c + d e f \); therefore, when the following equation sublates between the constant quantities of the general equation of a surface of the second degree, \( a x^2 + b f^2 + c d + \delta a b c + d e f \); the co-ordinates of the centre of this surface are infinite. The surface of the second degree has likewise diametral planes, for by transposing the ordinates it may be referred to three new planes, containing nine constant quantities; taking \( a, b, c \) for the new ordinates, the general equation becomes \( A u^2 + B v^2 + C w^2 + D x + E y + F z + G z + H w + K w + 1 = \infty \); exminating the terms in which the exponent of any one of the co-ordinates is odd, the following equations are obtained: \( D = 0, E = 0, F = 0, G = 0, H = 0, K = 0, (A) \). Of nine constant quantities, fix only are determined by these equations; hence it follows, that three planes may cut a surface of the second degree in four equal and similar parts in an infinite number of ways; it has therefore an infinity of diametral and conjugate planes, and of the three perpendicular ones, which intersect each other on the three direct lines on which are reckoned the axes of the surface. This property is analogous to that of curves of the second degree, which have an infinity of conjugate diameters, and in these curves there are two conjugate diameters perpendicular to each other, called axes. The three equations which express that the new planes of the co-ordinates are rectangular joined to the fixed equations \( (A) \), determine the nine constant quantities which enter into the equations of these planes.

Taking for granted what however may be demonstrated, that these constant quantities have always real values, we may suppose, that referring the surface of the second degree to its rectangular co-ordinates, its general equation will always be of this form, \( L x^2 + M y^2 + N z^2 + 1 = \infty \). We shall consider the surfaces comprehended under the general equation, and next the case where the centre is removed to an infinite distance from the origin of the co-ordinates.

Every surface of the second degree intersected by a plane, has for its section a curve of the second degree; for whatever be the planes, it may become, by the transformation of its co-ordinates, one of the planes to which the surface is referred, so that after this transformation, the equation to the surface is a term of the second degree; moreover, the equations of the sections made on a plane by the planes of the co-ordinates cannot be of a higher dimension than the equation of the surface, therefore every surface of the second degree cut by a plane has for its section a curve of the second degree likewise.

If the intersecting plane moves parallel to itself, the section remains always similar to itself; its axes remain always parallel, and its centre is on the same diameter of the surface, which may be thus demonstrated.

The equation of a curve of the second degree may always be reduced to this form,

\[ I x^2 + M y^2 + N z^2 + P = 0. \]

If in this equation \( f \) and \( g \) be substituted for \( x \) and \( y \), \( f \) being a constant quantity, the new equation which results from this substitution belongs evidently to a curve similar to the first, and similarly situated; it only differs from the first in the constant term, for after having divided all the terms by \( f \), it becomes

\[ L x^2 + M y^2 + N z^2 + \frac{P}{f} = 0. \]

Therefore all curves of the second degree, whole equations are of this form, differing only in the constant term, will be similar and similarly situated.

The general equation to a surface of the second degree being

\[ L x^2 + M y^2 + N z^2 - 1 = \infty. \]

Let
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Let the equation of any intersecting plane be
\[ z = Ax + By + C. \]

The projection of the intersection of the curve with the
surface on the plane \( x = 0 \) will have this equation,
\[
x^2 + (A + N AB) + B' = \frac{A^2 + 2 N x + 2 B C N y + C^2 - 1}{x} = 0 \]

If the intersecting plane be supposed to change its posi-
tion by moving parallel to itself, \( A \) and \( B \) will remain con-
stant, and \( C \) only will change its value; hence it follows that the
equations of \( x, y, z \) in the equation of projection,
will remain the same, whatever be the value of \( C \). But by the transforma-
tion of the co-ordinates this equation may be reduced to this form;
\[ l^2 + m^2 + n^2 + \mu^2 = 0; \]
in which the equation of the co-ordinates \( l^2 + m^2 \) only contain \( A \) and
\( B \); \( \mu^2 \) alone being some function of \( C \). If \( \mu \) be made to vary,
the value of \( \mu^2 \) may be supposed to become \( \mu^2 \), and the
preceding equation to become
\[ l^2 + m^2 + n^2 + \mu^2 = 0 \]

which as it only differs from the former in the con-
stant quantity, evidently belongs to a similar curve; hence it may be
demonstrated that all parallel sections are similar, and
similarly situated. Moreover, the locus of the centres of these
sections is in a diameter of the surface.

If in the equation \( Lx^2 + My^2 + N = 1 \) we sub-
stitute for the co-ordinates \( L, M, N \), the constant quanti-
ties \( \frac{1}{a^2}, \frac{1}{b^2}, \frac{1}{c^2} \), \( a \) being greater than \( b \), and \( b \) greater than \( c \); it be-
comes
\[ b^2 + a^2 + \epsilon \frac{a}{b} = a^2 b^2 + \epsilon \frac{a}{b} = \frac{a^2}{b^2} + \epsilon \frac{a}{b} \]

The advantage of this substitution is to render the sign of each
term of the equation independent of the particular values of
the co-ordinates, and to introduce as constant quantities
(in the equations of the sections of the surface by the planes of
the co-ordinates) only the principal axes of these sections.

From the different combinations of the signs three distinct
cases arise from equation \( E \); for a full investigation of which
we must refer our reader to the original work from which this
article was principally extracted. (Vide Analyse de
l'Analyse et de la Geometrie, par M. Monge.)

The three equations are
\[ \begin{align*}
b \epsilon x^2 + \epsilon a \frac{a}{b} = a^2 b^2, & \quad \text{or} \quad Lx^2 + M y^2 - N = 1 \\
b \epsilon y^2 + \epsilon a \frac{a}{b} = a b^2, & \quad \text{or} \quad Lx + M y - N = 1 \\
b \epsilon z^2 + \epsilon a \frac{a}{b} = a^2 b^2 & \quad \text{or} \quad Lx + M y + N = 1 \\
\end{align*} \]

The former belongs to the ellipsoid and the two others to
different species of hyperboloids.

GEOMETRY, Characters in. See Character.

GEOMETRY, Spherical. See SPHERICAL.

GEOGRAPHIC, Etc., in Antiquite, the division or
calls of the ancient Athenians employed in agriculture.

GEOGRAPHIA, in Botany, from \( \phi \) \( \rho \) \( \alpha \) \( \nu \) \( \alpha \) \( \phi \), a letter out, or
distributor of land, alluding to the mode of growth of the
first species of the genus in question, as hereafter described.

—Widey. Sp. Pl. v. 4. 593.—Cliffs and order, Monocot Mo-
naepli, Nat. Ord. Plantae.

Gen. Ch. . . . .

Eff. Ch. General Spatha double; of two valves. Male,
Calyx in three deep segments. Petals three. Filaments
fix, united into a cylinder. Female, Calyx and Corolla like the male. Style one,
locus, Stigmas of two lobes. Drupa dry, with one seed.

I. C. family. "Froonds pinnate; the pinne abruptly
jagged."—The taste of the Caracas, in shady woods on
the lofty mountain of Baenovita. Bredeneyer.—The trunk
is simple and slender, an inch in diameter, smooth, rising to
the height of fifteen feet, when, by the power of the wind
on its ample foliage, it is blown down, but soon produces
new shoots and roots from the top, whence a new trunk
springs up to the fame height of about fifteen feet, and in
its turn is quickly laid prostrate like the former. The
froonds (rather leaves) are pinnate, their pinne irregular,
the leaves folded, jagged abruptly at the summit. Spatha
double, of two valves, wedge-shaped, somewhat compressed,
acute, three inches long. Spadix fifteen inches in length,
branching at the top, the branches round, bearing each from
seven to nine alternate, cylindrical spikes, of the length
of three inches each. Flowers conically, three, in a flower
bowl of the spike, two of which are male, one female.

Dropra dry and fibrous, the size of a pea. Nut globose, black.

2. G. bimphlicifrons. "Froonds simple, wedge-shaped,
clown."—Found at the Caracas with the former. Bred-
neeyer.—The trunk of this is permanently upright, ten feet
high, an inch thick. Froonds (or leaves) a foot long, simple,
shape-shaped, taper at the base, cloven, and divergatated
at the summit, supported on very long stalks. Spatha
double, of two valves. Spadix bearing at its extremity three or
four cylindrical spikes. Flowers immersed in little cavities,
like the former. Willdower.

GEOPONIC, something describing or relating to agri-
culture. Cato, Varro, Columella, Palladius, and Pliny,
are sometimes called geoponic writers.

GEORG, St., in Geography, a town of Germany, at the
confluence of the rivers Teya and March, formerly a roval
city, but now much reduced; 24 miles N. N. E. of Preb-
burg.—Also, a town of Hungary; 7 miles N. N. E. of
Presburg.

GEORGE, in Geography, surnamed the Cappadociam,
was made bishop of Alexandria when Athanasius was driven
from that see by the perfecutions of the emperor Con-
stantius, about the year 355. (See ATHANAS.) He was a
native of Epiphania, in Cilicia, where his father purfied the
business of a fuller. From this obscure situation the fou
ruined himself, it is laid, not by the most honourable means,
to the itation of a prelate in the church. At first he obtained
a lucrative appointment as purveyor of bacon to the
army: not contented with the regular profits of his office,
he made use of every art, however base and corrupt, in the
accumulation of wealth; so as to render a mean employment
honourable. His depredations on the public purse became
so notorious, that he felt it extremely dangerous to wait the
issue of a suit commenced against him. He fled
from the pursuit of justice, and contrived to take with him
his ill-gotten wealth. The place of his retreat was Alex-
andria, where he professed great zeal for the Arian fystem
of theology, and being a man of superior talents, he acquired
considerable influence with his disciples in that city. Here
he collected a large and very valuable collection of books,
which the emperor Julian afterwards made the foundation
of the noble library established by him in the temple erectd
in honour of the emperor Trajan, but which was burnt by
the connivance of the emperor Julian. When Athanasius
was driven from Alexandria, George was elected bishop by
the prevailing party. In this itation his conduct was in the
highest degree cruel and oppressive. He persecuted the Cath-
olics with an unrelenting hand, and the other inhabitants
of this vall diecefe were objects of his tyranny and avarice.
The merchants he impoverished by unjust monopolies and
cruel taxes; the Pagans, who had been excited with the
hopes of freedom and toleration, did not escape his rapacity,
and the rich temples of Alexandria were either pillagrd or
influted by him, who exclaimed, in a haughty and threaten-
ing tone of voice, "How long will these impudente be per-
mitted..."
GEORGE.

wished to fland." The people endured all these acts of oppression till their patience was exhausted; they then rose in stone man, and expelled him the city. With much difficulty he regained his authority, which he held till the year 362, when the accession of Julian to the empire was the signal for the downfall of the bishop. He, and two other persons, who had been ministers of his atrocities, were ignominiously dragged in chains to the public prison. Here, after a confinement of a few days only, they were attacked by the pagan populace, who forced open the doors of the dungeons, and with cruel insults maffacred the vile wretches. Their lifeless bodies were carried in triumph through the streets on the back of a camel, and after having suffered every indignity, they were thrown into the sea, with the avowed intention of disappointing the devotion of Christians, who, they foresaw, would gladly canonize the tyrant as a martyr and saint. The fears of the Pagans were justified, but their precautions were ineffectual. The meritorious death, as it was denominated, of the prelate, obliterated the memory of his life, and the infamous George of Cappadocia has been transformed into the renowned St. George of England, the patron of arms, of chivalry, and was the patron saint of Crete, Bari, and the Gregories; did not acknowledge his companion, and Pope Gelius, about the year 494, is the first Catholic who acknowledges St. George, and who placed him among the martyrs of the churches. He rejects his acts as spurious, and as the composition of heretics. His fame and popularity in Europe, and especially in England, proceeded from the crusades Gibbon, vol. iii. and iv. Moreri.

GEORGE OF TREBISOND, a learned modern Greek, was born, in 1395, in the isle of Crete, of a family originally from Trebizon, from which he derives his name. He came to Italy about 1420, and obtained the patronage of Francis Barbaro, a noble of Venice, through whose means he was invited to a professorship of Greek at Vicenza. Thence he removed to Venice, where he acquired great reputation as a grammarian and instructor in Greek eloquence. After this he obtained an invitation from pope Eugenius IV. to settle at Rome, and, during the life of the pontiff, he was occupied in teaching rhetoric and philosophy, and in translating several practical Greek works into Latin. He acquainted himself with the pope, Nicholas V., at whose instance George might have lived happily, had not his own temper involved him in many disputes with the learned men about the papal court. With Poggio he came to blows, and it was necessary to refer to the authority of the apostolic secretaries to part them. His own conduct at length forced him from Rome, and he took refuge, in 1452, at Naples, where he was graciously received by king Alphonso, but he did not partake of his liberality, and had great difficulty, at this period, in maintaining his family. It is supposed, that by the interference of his friend Filippo, he was reconciled to the pope, and that he returned to the papal city; but in 1459 he was at Venice, where he presented to the doge his version of Plato's book on laws, and was then engaged as a professor of helles lettres. In 1464 he went to Crete, and passed thence to Constantinople. On his return he found his own scholar Paul II. on the papal throne, which led him to visit Rome, but his treatment there did not probably correspond with his expectations; he was, for some offence not known, cast into prison, where he was kept during a space of four months. He died about the year 1465. He lived to a good old age, and was author of many works on rhetoric and subjects connected with polite literature; and he translated many others, particularly of the fathers, from the Greek into the Latin. He is esteemed very highly for the share which he had in introducing Greek literature into the West. His Latin style was far from poetical; and in controversy he dealt much in invective. The comparison which he indulged between Aristotle and Plato gave great offence to the adherents of the latter, particularly to cardinal Bellarion, who wrote an answer to him. Gen. Biog.

GEORGE, called also Athon, flourished about the close of the 16th century, and was at Rome under the pontificate of Clement VIII. He published "A Syriac and Chaldean Grammar" in 4to, in 1596. He was, after this, elected patriarch of the Maronites, among whom he introduced the use, and explained the principles, of the Gregorian calendar. He died about the year 1641. Moreri.

GEORGE LEWIS I., king of Great Britain, and elector of Hanover, the son of the elector Ernest-Augustus, by Sophia, daughter of Frederick elector-palatine, and granddaughter of James I., king of England, was born in 1660, and trained to the profession of arms under his father. When he had arrived to the estate of manhood, he engaged in the service of the emperor against the Turks, and became illustrious as a warrior in three campaigns in Hungary. He next distinguished himself in the war between the empire and France, and in the year 1700 he succeeded, on the death of his father, to the electorate. In the following year he marched to the assistance of the duke of Holstein, who was attacked by the king of Denmark, and obliged the Danes to raise the siege of Tonningen. He joined the alliance against France in the succession war, and forced the princes of the house of Wolfenstein to quit their alliance with the French. The command of the army of the empire was conferred upon him in 1707, but after the duties of three campaigns, in which he had been able to act only on the defensive, he resigned his command, and left his own troops in the service of the allies. At the peace of Ratisbon, Lewis XIV. recognized the electoral dignity in the house of Lunenburg, as he had before, at the peace of Utrecht, the succession of the same house to the crown of Great Britain. This event happened on the death of queen Anne in 1714, when the prince, now George I., was in the fiftieth year of his age. He was already celebrated for the wisdom and justice of his government, and his personal qualities, though limited in his views by the interests of a German prince, and but little acquainted with the character of the nation he was about to rule. "It is evident," says an historian, "that the title of this prince was founded solely on the choice of the parliament, that is, of the people, and that the usual order of succession was entirely superceded. For, admitting the male line of the house of Stuart to have been extinguished in the person of James II., the right of blood rested in the house of Savoy, descendend from Henrietta, duchess of Orleans, daughter of Charles I." Thus the rights of the people were fully exercised, and the family on the throne is in truth an elected family, though the general law of succession remains unaltered. The king threw himself into the arms of the Whig party, who, indeed, alone openly maintained those principles upon which the right of his crown was founded. Of thee the fundamental one was the superiority of the national will, in appointing a chief governor, to any claim derived from hereditary right. Such a principle had been already assumed, and was the only one that could justify the nation in setting aside the immediate heirs to the crown, on the plea of difference of religion. (See Whigs.) As soon as this prince was seated on his throne, the late Tory ministry were called to account for their conduct, particularly with respect to the treaty of Utrecht, and several of the heads of it were impeached, and either im-
prisoned, or driven into exile. These measures were the cause of great dissatisfaction; tumults were excited in various parts of the kingdom, and at length, in September 1715, the earl of Mar set up the standard of rebellion, and proclaimed, with due honours, the pretender. The plan was ill concerted, and very weakly supported, and early in the following year it was entirely quelled, but several of the leaders lost their lives on the scaffold. Still a large body of the people were disaffected to the new family, and the power of the Tory party was so formidable, that the ministry, to establish their authority, had recourse to septennial parliaments, instead of triennial ones, according to the law of the land. It was agreed by men of all parties, who were not personally interested in the change, that this innovation was a most gross violation of the principles of the constitution, which no temporary necessity could justify. The king had, about this period, acquired by purchase the duchies of Bremen and Verden, in order to extend his power as elector of Hanover. By the acquisition he was involved in a quarrel with Charles XII. of Sweden, who threatened to invade Scotland in favour of the claims of the pretender. The earl Peter also concurred in the scheme. To obviate the danger, the king entered into a triple alliance with Holland and France, a fleet was sent up the Baltic to awe the Swedes, and all commercial intercourse with that nation was suspended; but the death of Charles XII. in 1717, and the subsequent changes in the politics of Sweden, put an end to the alarm in that quarter, and secured George in the quiet possession of his newly acquired continental acquisitions. The ambition of the court of Spain, governed by cardinal Alberoni, disturbed the peace of Europe, and occasioned a quadruple alliance between the three powers above-mentioned, with the accession of the emperor. The seizure of Sardinia, and invasion of Sicily by the Spaniards, gave a pretext for sending a powerful English fleet into the Mediterranean under sir George Byng, who fell in with, and almost totally destroyed the Spanish fleet. This succedee was followed by the recovery of Sicily and Sardinia, and Spain was under the necessity of acceding to a peace dictated by the allied powers. A pacification of the north of Europe was also effected by the mediation of England. The national delusion and calamity in the year 1720, (see BUBBLE) recalled the king from a visit to his German dominions, and the prudent measures of parliament produced the reformation of public credit. In 1722 a new conspiracy against the government was discovered, and several persons were apprehended in consequence of it, among whom was Dr. Atterbury, bishop of Rochester, who was punished with perpetual banishment. The ministers of France and England, Fleury and Walpole, being friendly to peace, preferred a good understanding between the two countries for many years. Several treaties were negociated under the pretence of maintaining the balance of power, but usually other private ends were to be answered by them. The leading principle of George I. was the safety and prosperity of his German dominions, to the interests of which, those of Great Britain were, on various occasions, laid to be sacrificed. In 1725, a treaty between the emperor and the king of Spain excited the jealousy of king George so much, that he counteracted it by another at Hanover, compelling most of the other European powers, and he sent a fleet to the West Indies under admiral Hoffer, in order to block up the Spanish galleons at Porto Bello. The death of the admiral and most of his crew from disease, was considered as one of the most inglorious disasters of the reign. The Spaniards then besieged Gibraltar, but all differences were finally settled by a negociation. The king of England seemed at length to have surmounted all his political difficulties, and a prospect of permanent peace and tranquility appeared to open upon him. The toils, and dangers, and anxieties which he had felt during his whole reign seemed at last to be rewarded with glory, happiness, and repose. He thought every circumstance was favourable to his visiting his electoral dominions, and embarked for that purpose at Greenwich, June 3, 1727. He landed in Holland on the 7th, but in his journey from thence to Hanover he suffered a paralytic seizure, and feeling that he was near the end of his long journey, he exclaimed to his attendant, "C'est fait donc, yot." He reached the palace of his brother, the bishop of Osnaburg, but could not advance farther. He died June 11, 1727, in the sixty-eighth year of his age, and the 13th of his reign. He has been characterized as plain and simple in his appearance, grave and sedate in his manner, but easy and familiar among his intimates, in whole society he was fond of relaxing from the cares of the state. He possessed much natural prudence and good sense, and well understood his interests, at least so far as the objects nearest his heart were concerned. According to the crown of Great Britain when far advanced in life, he seemed ever to consider himself rather as elector than as king, and the influence and power of Great Britain were of little estimation in his eyes when directed to any other end than the aggrandizement of his native country. In the view of Europe at large, he fulfilled the character of a prudent, able, and fortunate prince. His government was not without defects in the administration, but he was unquestionably a zealous friend to civil and religious liberty. He had female favourites, but was not governed by them. He had little or no taste for literature and science, and was unable to appreciate their value, yet he founded in each university a professorship of modern history. He was, however, a lover of music; and soon after his accession established regulations for the conduct of this part of the service in the royal chapel. He had married in 1681, his cousin Sophia Dorothaea, daughter of the duke of Zell, a match that was attended with little domestic happiness. He left behind him one son, who succeeded him in his crown.

GEORGE AUGUSTUS II. king of Great Britain, son of the preceding, was born in 1683, and came to England with his father in 1714, where he received the rank and title of Prince of Wales. In 1716, he was appointed regent during the king's absence. After this, on account of some private difference with his father and fam., the latter lived for some time in a state of imprisonment from the court. He succeeded to the throne in 1727, and adopted the same ministers and measures which had governed the nation during the life of George I. He inherited also, in full force, the attachment which his father bestowed on his German interests, which swayed the councils of his cabinet, though it was frequently obliged to give way to other considerations. Europe, for some time, was in a state of peace, through the influence of the treaties of Seville and Vienna, the latter of which guaranteed the Pragmatic sanction, or the law by which the female heirs of the emperor Charles VI. were to succeed to the hereditary dominions of Austria. In 1732 Walpole introduced into parliament the financial scheme of a great extent of the excise; but the violent opposition it met with from the nation obliged him to relinquish the object. What the people refused to submit to at that period has been since adopted almost without a murmur. In the year 1737, complaints were made against the government for abridging liberty, by a bill for limiting the number of playhouses, and submitting dramatic writings to the inspection of the lord chamberlain. Difputes had long pre-
voiled between Spain and England, on account of the trade carried on in the West Indies by their respective subjects. In 1739, the matters in debate were compromised by a convention settled by the respective courts, but its terms were so little satisfactory to the traders, that Walpole found himself obliged by their clamours to prepare for hostilities. War was declared, and Portobello taken by admiral Vernon. The war, however, did not turn out so successful as the people expected, so that a clamour was raised against the minister, and Sir R. Walpole was obliged to resign in the year 1742.

At the same period France, and the other powers in league with her, seemed determined, on the death of the emperor Charles VI, to stir her daughter Maria Theresa of her inheritance, which had been guaranteed to her by the Pragmatic sanction. In defence of her just right, George sent an English army to the continent, and also a large body of forces from his electorate, who were taken into British pay.

The king himself joined the army, which was under the command of the earl of Stair, and displayed great bravery. Victory declared itself in favour of the British, but they were forced to leave their wounded to the care of the enemy. Soon after, the command of the allied army devolved on the king's second son, the duke of Cumberland, who was reckoned very deficient in talents as general of a great army. Under him was lost the bloody battle of Fontenoy in 1744, and the French maintained an undoubted superiority in Flanders during the remainder of the war. In the following year the adherents of the pretender encouraged him to try his fortune by a descent, in the northern part of the kingdom, where he might expect an immediate and decisive declaration to be made in his favour. His son, accordingly, under the protection of the court of France, landed on the coast of Scotland, in the month of July. He was received with much respect and affection, and was immediately joined by several of the clans, with whom he proceeded to the north, enlarging his small army with all those who would join in his cause. At Perth he proclaimed his father king, and immediately after took possession of Edinburgh, defeated a body of the royal troops at Preston Pans, and marched into England, where he had the strongest assurances of being powerfully reinforced. He proceeded to Derby, but found the people no where zealously inclined to support his cause; at length the duke of Cumberland arrived from Flanders, with several English regiments, engaged and defeated the rebels, and thus put an end to the hopes of the pretender, who could no longer be considered as an object of terror or alarm. The government of the house of Brunswick was from this period more firmly established; and it appeared that the greater part of the nation had indubitably connected the interests of religion and liberty with the support of those principles which called the family of the reigning prince to the throne. In 1748, peace was negotiated, and established by the treaty of Aix-la-Chapelle; this treaty did not correspond with the expectations of the people, but it was welcomed as a relief from the burthens needlessly imposed by a state of warfare. In 1751, the king lost his eldest son, Frederick, who had lived a considerable time at variance with his father, but who had made his peace with the court after the dissipation of Walpole. This prince, the father of our present sovereign, was amiable and well disposed, and the fondest hopes had been entertained of the patronage which he would have exhibited on the throne to which he was heir, and of which he was deprived by an early death. In 1755, a war broke out between Great Britain and France, the events of which, though truly important to the kingdom, are in no great degree connected with the character of the king. To his apprehensions for the safety of his German dominions, was imputed the alliance formed with the king of Prussia, and the employment of a large force in continental warfare. This was the least glorious part of the public transactions, and during the early years of the contest events were very unfavourable to England; but when, at the demand of the people, the king summoned to his councils the great William Pitt, afterwards earl of Chatham, the tide of successes set full in upon the measures of government. The French power in the East Indies was annihilated; and in America the reduction of Louisburg was followed by that of Canada. The island of Guadalupe, and the British settlement of Senegal, fell under the British dominion, and the famous battle of Minden exalted the reputation of the British soldiery. The navy of England reigned triumphant over the seas, while that of France was reduced to insignificance, from which it never after completely recovered. Notwithstanding all this success the German war was unpopular, and ministers were reprehended for the sacrifices which they had made, or were supposed to have made, to the personal wishes of the king.

In this state of affairs George II. suddenly died from a rupture of the right ventricle of the heart, which, without any previous illness or suffering, terminated his life on the 29th of October 1760, in his seventy-third year, and in the thirty-third of his reign. During this long period he had experienced many vicissitudes of fortune, but he lived to see himself the most successful of all the English monarchs. He was endowed by nature with an understanding by no means comprehensive, and he had taken little pains to improve and expand his original powers by intellectual cultivation.

Equally a stranger to learning and the arts, he saw the rapid increase of both under his reign, without contributing in the remotest degree to accelerate the progress by any mode of encouragement. He was hafty and obdurate in his temper, yet a natural goodness of heart, a love of justice, and an honest openness of disposition, conciliated the affection of his people, and have inspired respect and veneration for his memory. He was a firm friend to the establishe laws and liberties of the kingdom, and it must be admitted, highly to his honour, that the general principles of his administration, both civil and religious, were liberal and just. Many of the penal statutes, which still remain unrepealed, were in the reign of this prince reiterated, and virtually suspended, by the mildness and equity of the executive government. And he will long be remembered for his declaration, 'that during his reign there should be no persecution or confinement for conscience sake.' On various occasions he had given sigual demonstrations of personal bravery, nor did the general tenour of his conduct afford proofs less striking of his rectitude and integrity. If he cannot be ranked among the greatest, he is certainly entitled to be ranked among the most respectable princes of the age in which he lived.

George, St. a name whereby several orders, both military and religious, are denominated. It took its rise from a saint famous throughout all the East, called by the Greeks ΑΓΙΟΣ ΓΕΩΡΓΙΟΣ, O Holy George. He is generally represented on horseback, as being supposed to have frequently engaged in combats in that manner.

He is highly venerated throughout Armani, Muffcovy, and
GEORGE.

and all the countries which adhere to the Greek rite; from the Greek, his worship has long ago been received into the Latin church; and England and Portugal have both chosen him for their patron saint. See George of Cappadocia.

George, St. is particularly used for an English order of knights, more commonly now called the order of the Garter. See Garter.

George, knights of. There have been various orders under this denomination, most of which are now extinct.

The order of St. George, at first called the order of the "Golden Angel," is said to have been instituted by Constantine the Great, in the year 312. The collar is composed of fifteen oval plates of gold, richly chafed on their edges, and enamelled blue. On 14 of these plates is the cypher of the name of Christ, composed of the Greek capital letters X and P between the two capitals A and T, signifying that Jesus Christ is the beginning and end; but on the centre oval, which is edged with laurel leaves, the cypher XP is placed on a cross patence gules, edged or, and having on its points the letters I. H. S. V.; and from the bottom of the figure was the figure of St. George killing the dragon. The habit of the knights was a long cloak of sky blue velvet, lined with white silk, tied at the neck with a cord of crimson silk and gold intermixed, terminating at each extremity in a large tassel; on the left breast of the cloak was embroidered the cross of the order.

The order of St. George in Austria and Carinthia was instituted, as some say, by Rudolph, count of Habsburg, the first emperor of the house of Austria, about the year 1273 or 1290; or, as others say, by the emperor Frederic III., in order to guard the frontiers of Germany, Hungary, Austria, Carinthia, and Styria, from the inroads of the Turks.

The badge of the order was a plain purple cross edged with green.

The order of St. George in Burgundy was founded, in the year 1400, by Philip de Miojard, a gentleman of Burgundy, on account of his having brought from the East some relics of St. George, which he deposited in a chapel erected for the purpose, near to the parish church of Rougamaon. The badge of the order is a St. George on horseback, overthrowing a dragon, similar to that on the collar of the order of the garter. It was worn pendent to a blue ribbon tied to a button-hole. Women were admitted into this order.

The order of St. George in Austria was refounded by the last emperor Maximilian, who directed that the badge of the order should be a crof croset botonnee gules, encircled on the upper part with a ducal coronet or, and worn pendent from three chains of gold.

The order of St. George at Genoa was instituted in 1472. The doge of Venice is perpetual grand master of the order. The enlignt of the order is a plain red cross, worn round the neck, pendent to a ribbon.

The order of St. George in Rome was founded by pope Alexander VI., in the year 1492. The collar of the order was a gold chain, to which was pendent an enamelled figure of St. George on horseback, throwing down a dragon, and piercing it with a lance. The badge was a gold cross within a circle of gold, like an open crown.

The order of St. George at Ravenna is supposed to have been instituted by pope Paul III. in 1534. It was abolished by pope Gregory in 1752.

The order of St. George, defender of the immaculate conception of the blessed Virgin Mary, was instituted at Munich by Albert, elector of Bavaria, in the year 1729, and confirmed by the pope. The person admitted into this order must prove his gentility for five generations both on his mother's and father's side. The badge of the order is a star of eight points; on the centre is enamelled the image of St. George on horseback, flying a dragon; the cross is enamelled blue, and edged with white, and cantoned with smaller crofses, enamelled blue and white; which, pendant to a sky-blue watered ribbon, edged with white, is worn by the knights. On the left breast of the knights also wear the same star embroidered, having on the centre a red cross. On festivals they wear a collar composed of oblong plates with crowns at each end, and columns surmounted with globes; each column supported by two lions, holding in their anterior paws fleur-de-lis, joined together with lozenge-chains enamelled blue and white; on the oblong plates is the following motto: "In fide, justitia, et fortitudine."

The military order of St. George in Russia, called also the order of "Merit," was instituted by the empress Catherine II. in 1769, has the precedence over that of St. Anne of Holstein, and was divided into four classes. — The badge is a crose of gold, enamelled white, on the centre of which is a medallion, with the figure of St. George slaying a dragon. This is worn pendent to a black ribbon edged with orange colour, and two stripes of orange on the black. Those of the first class wear it under their coat, passing from right to left; and on the left breast of their coat is a star wrought in gold, in the shape of a lozenge; on the centre of the star are embroidered the figure of St. George and the dragon. Those of the second class wear the badge pendent to a ribbon passing round their neck, and a star on their left breast. Those of the third class wear the badge pendent to a narrow ribbon which passes round their neck; but they have no star. Those of the fourth class wear the badge pendent at the button-hole of their coats.

Each knight of the first class receives an annual fabric of 700 roubles = 140/. each of the second class 400 roubles = 80/. per annum; all of the third class 200 roubles = 40/. per annum; and each of the fourth class 100 roubles = 20/. per annum. The fund of this order, assigned by the empress for the payment of their salaries, and other expenses, is 40,000 roubles = 8000/. per annum. Of this 1680 is deeded for the first class, and 2000 for each of the remaining three. The number of knights is unlimited. In 1778, the first class, which is confined to commanders in chief, contained only four; the second class comprised only eight knights; the third, forty-eight; and the fourth two hundred and thirty-four. No person can obtain this order without having performed some gallant exploit, or having served in the ranks of an officer 25 years by land, or 18 by sea.

The order of St. George of Alcasa, or the order of Montesa, is an order of knighthood in Spain. When the order of knights-templars became extinct in Spain, an order was instituted, about the year 1317, to supply their places, in consequence of a permission for that purpose obtained from pope John XXI., at which time Montesa in Valencia was selected as a proper place for the residence of the knights. In the following year, James, king of Aragon and Valencia, built at Montesa a noble college for their habitation, and dedicated it to St. George: and hence the order assumed its appellation of the order of St. George of Montesa. The habit of this order is a white mantle, on the left breast of which is embroidered a plain red cross. The badge of the order is a plain red cross, enamelled on gold, which is worn in samewise, pendant to a broad red watered riband. The order of St. George of Alcasa, was instituted about the year 1201, at a town of that name in the diocese of Tortosa. In 1399 the order was united to that of Montesa, by pope Benedict XIII., and that union was confirmed in the council of Constance.

George, Religious of the order of St. Of these there are divers orders and congregations; particularly canons regular of St. George in Alga, at Venice, established by authority of
GEORGE.

of pope Boniface IX. in the year 1404. The foundation of this order was laid by Bartholomew Colonno, who preached, in 1396, at Padua, and some other villages in the state of Venice. Pope Pius V. in 1570, gave these canons precedence of all other religious. Another congregation of the same institute in Sicily, &c.

St. George's Cross. See Cross.

George noble, a piece of gold, current at six shillings and eight-pence in the reign of King Henry VIII.

George Bank, in Geography, a rocky shoal, near the west coast of Sumatra. N. lat. 34° 38'. E. long. 96° 12'.

George Cape, a cape on the S. coast of Kerguelen's Land. N. lat. 48° 33'. E. long. 151° 15'.—Alfo, a cape on the W. coast of Newfoundland. N. lat. 48° 28'. W. long. 59° 17'.—Alfo, a cape on the N. coast of the island of South Georgia. S. lat. 54° 17'. W. long. 36° 34'.—Alfo, a cape on the coast of Peru. S. lat. 23° 56'.—Alfo, a cape on the coast of New Holland, discovered on St. George's day by lieutenant Cook, and so called by him. S. lat. 35° 10'. W. long. 208° 51'.

George St., Cape, a cape on the W. coast of Newfoundland. N. lat. 49° 30'. W. long. 59'.—Alfo, the southern extremity of New Ireland. S. lat. 5°. E. long. 152° 15'.

George Creek, a town of America, in Allegony county, Maryland; 152 miles from Washington.—Alfo, a river of America, which runs into the Potomack; 12 miles S.W. of Fort Cumberland.

George Island, an island of America, lying between lake Superior and lake Huron. N. lat. 46° 15'. W. long. 84° 20'.

George's Islands, two islands in the South Pacific ocean, discovered by Commodore Byron in 1765, and so called by him in honour of his majesty. They were again observed by captain Cook in 1777, in the passage from the Marquesas to Otaheite. One of these islands, called by the inhabitants "Tiooka" was of an oval shape, and about 10 leagues in circuit, lying in the direction of E.S.E. and W.N.W., and situated in S. lat. 14° 27' 30", and W. long. 144° 56'.

The inhabitants of this, and probably of the other low islands, are of a much darker colour than those of the higher islands, and seem to be of a much more ferine disposition; which captain Cook attributes to their situation. Nature not having bestowed her favours on these low islands with that profusion the has done to some others, the inhabitants are chiefly indebted to the sea for their subsistence; consequently they are much exposed to the sun and weather, and thus become more dark in colour, and more hardy and robust; for without doubt they are of the same nation. They were observed to be stout, well-made men, and on their bodies was marked the figure of a fish;—a very good emblem of their profession. The other island was similar to the former, extending N.E. and S.W. near four leagues, and from five to three miles broad. It lies S.W. by W., again observed on the west end of Tiooka; and the middle is situated in S. lat. 14° 27'. W. long. 145° 10'. The natives of these islands appeared to be armed with long spears and clubs; their aspect and movements were hostile; some of them, however, appeared to captain Cook to manifest a friendly disposition; but they seemed to have no inclination to maintain any intercourse with him. They supplied him with dogs, which were plentiful, and cocoa-nuts, which were the only fruit they saw. These furnished them with almost all the necessaries of life, particularly food, fuel, cordage, timber, and vessels to hold water; and with a view to this use of them, their habitations, which were mean low hovels, thatched with cocoa-nut branches, were selected near groves of these trees. Scurvy-graffs was obtained in great abundance. Their canoes, which they are cextrous in navigating, are large and curiously constructed. Commodore Byron observed the shore to be covered with coral, and the shells of very large pearl-oysters; and he conceived that a very profitable pearl-fishery might be established on these islands. The women had a piece of cloth, appearing to be fabricated of the same stuff with their fins, which hung from the waist as low as the knee; but the men were flark naked. Near the huts of these people were buildings, that appeared to be burying-places, from the structure of which it was inferred that they had great veneration for the dead. In this water is feerves. Each of these islands has in it a lagoon, or large salt-water lake. The people are much addicted to theft.

George Lake, a lake of East Florida, which is an enlargement of the river St. Juan, or St. John. It is also called "Great Lake," being about 15 miles wide, and generally about 15 or 20 feet deep, except at the entrance, which has a bar with 8 or 9 feet of water. This lake is beautified with two or three fertile islands, the largest of which is about two miles broad, commanding an extensive prospect, bearing evident marks of a large town of the Aborigines, and appearing to have been the chosen residence of an Indian prince.—Alfo, a lake that lies to the southward of lake Champlain. The portage between the two lakes is one mile and a half. The water of this lake is very clear, and was formerly used by the French in Canada for sacramental purposes, whence the lake was denominated lake "Sacra-
ment." This lake is about 30 miles long, and from one to seven wide. It embosoms more than two hundred islands, or, as some say, three hundred and sixty-five; most of which are barren rocks, covered only with heath and a few cedars, spruces, and hemlock trees. There is a large lake, with rattle-raftes. The remains of Fort George stand at the south end of the lake, about 14 miles N. by W. of Fort Edward, on Hudson river. The famous fort of Ticonderoga, which stood on the north side of the outlet of the lake, where it discharges its water into lake Champlain, is now in ruins.—Alfo, a lake in Upper Canada, situated below the Falls of St. Mary, and N. of Muddy lake; it is about 25 miles long, with very shallow water.

George's Sound. See NOOTKA.

George, St., the largest of the Bermudas islands, about 15 miles in length and three in breadth, containing about 500 houses, surrounded and defended by a chain of rocks, which extend some way into the sea, so that ships can approach it only in two places, and not without the assistance of an experienced pilot. It is divided into nine parishes or districts. It has a town of the same name, containing a town-house, where the governor, council, and magistrates assembled, a handsome church, and a library. N. lat. 32° 40'. W. long. 64° 32'. (See BERMUDAS.)—Alfo, a town, or village, near the centre of the island, containing 30 families, with the seat of Delaware, N. America; situated on a creek of the same name, which falls into the Delaware river four miles below it, and a little above Reedy island; 45 miles S.W. of Philadelphia.—Alfo, a town and capital of the island of Grenada, and also one of its six parishes, formerly called by the French "Fort Royal." It is situated in a spacious bay, on the west side of the island, not far from the south end, and poffefieds one of the finest and most commodious harbours in the English West Indies, which has been lately fortified for a great expense, and being one of the ports of entry belonging to the island was made a port by 27 Geo. III. c. 27. The town of St. George is built chiefly of brick, and makes a handsome appearance. It is divided by a ridge, which, running into the sea, forms...
on one side the carenage, and on the other the bay. Accordingly here is the "Bay-town," which has a handsome square and market-place, and the "Carenage-town," in which the principal merchants reside; the ships lying land-locked, and in deep water close to the wharfs. On the ridge between the two towns stands the church, and on the promontory above it is a large old fort, which was probably constructed by the first French inhabitants. It is built of field-stone, and large enough to accommodate an entire regiment. N. lat. 12° 45'. W. long. 61° 31'.

Edwards's West Indies, vol. ii.—Alfo, one of the Azores islands, about 10 leagues in length, and two in breadth. The soil is generally level, except towards the north, where it is rocky and barren; it is elsewhere fertile in corn, and the other necessaries of life. It is chiefly remarkable for a great number of lofty and full-grown cedars, with which the natives carry on a considerable trade. N. lat. 38° 39'. W. long. 28°.—Alfo, a town of Hindustan, on the coast of Malabar; eight miles S. of Cochin.—Alfo, a sea-port on the island of Sciro. N. lat. 38° 58'. E. long. 24° 37'. —Alfo, a small island in the Grecian Archipelago, three miles E. of Milo.—Alfo, a small island in the Grecian Archipelago, at the entrance of the gulf of Sandarick. N. lat. 38° 48'. E. long. 26° 42'.—Alfo, a small island in the East Indian sea, near the coast of Hindustan; four miles from Goa.—Alfo, a town of France, in the department of the Mayne and Loire; 20 miles S.S.W. of Angers. —Alfo, a large and deep bay on the W. side of Newfoundland. N. lat. 48° 12'.—Alfo, a river of America, or rather an arm of the sea in Lincoln county and state of Maine, lying about two leagues S.W. of Penobscot bay. This river is navigable for brigs and ships of a large burden up to the narrows; and from thence about four miles higher, to nearly the head of the tide, for sloops and schooners of 80 or 90 tons. It is about half a league wide up to the narrows. The navigation is in winter. This river abounds with all kinds of fish.—Alfo, a river of St. Mary's county, in Maryland, which is a broad but short creek, having its mouth between Pusey point and St. Mary's river on the north bank of the Potomack; opposite to the island of the same name.

St. George's Bank, a fishing bank in the Atlantic ocean, in the Maffachusetts, E. of cape Cod. It extends from north to south between 41° 15' and 42° 22' N. lat., and between 67° 50' and 68° 40' W. long.

St. George's Bay, a bay of the Pacific ocean, on the S.E. coast of New Ireland, between cape St. George and cape Orford.

St. George's Channel, that part of the Atlantic ocean which is situated between Ireland and Wales.—Alfo, a strait of the Pacific ocean between New Britain and New Ireland, 300 miles in length.—Alfo, a strait between the little Nicobar and Sambelong islands, in the East Indian sea.

St. George's Island, a small island in the mouth of the river Potomack. N. lat. 38° 15'. W. long. 76° 24'.

St. George's Islands, a cluster of small islands near the coast of East Florida, opposite to the mouth of the Apalachicola.—Alfo, small islands in the Atlantic, near the coast of Maine in America. N. lat. 43° 50'. W. long. 68° 10'.

St. George's Key, was one of the principal British settlements in the bay of Honduras, taken by the Spaniards during the American war, but retaken by the British soon after. The British settlements on the Mosquito shore, and in the bay of Honduras, were surrendered to the crown of Spain at the Spanish convention, signed at London on the 14th of July, 1786. N. lat. 17° 35'. W. long. 88° 43'.

St. George d'Alboros, an island in the Grecian Archipelago, about seven miles in circumference. N. lat. 37° 28'. E. long. 23° 20'.

St. George de Comiers, a town of France, in the department of the Aisne; nine miles S. of Grenoble.

St. George d'Elmina, See Elmina.

St. Georges-en-Conflans, a town of France, in the department of the Loire, and chief place of a canton in the district of Montoiron, 9 miles N.W. of Montbrison. The place contains 1020, and the canton 7271 inhabitants, on a territory of 2071 square kilometres, in 8 communes.

St. George d'Esperance, a town of France, in the department of the Ile; 18 miles S.E. of Lyons.

St. Georges de Lévéjac, a town of France, in the department of the Lozere, and chief place of a canton in the district of Florac, 18 miles S.W. of Mende. The place contains 1000, and the canton 2600 inhabitants, on a territory of 127 square kilometres, in 5 communes.

St. Georges fur Loire, a town of France, in the department of the Mayne and Loire, and chief place of a canton in the district of Angers; 9 miles S.W. of Angers. The place contains 2420, and the canton 9951 inhabitants, on a territory of 205 square kilometres, in 9 communes.

St. Georges-des-Bailloingeaux, a town of France, in the department of the Vienne, and chief place of a canton in the district of Poitiers. The place contains 1119, and the canton 6027 inhabitants, on a territory of 190 square kilometres, in 14 communes.

St. Georges d'Ognes, a town of France, in the department of the Herault; 4 miles W. of Montpellier.

St. George de Renteubaut, a town of France, in the department of the Ille and Vilaine; 9 miles N. of Fougeres.

St. George in Reib, a town of Austria, 6 miles S.E. of Waidhoven.

St. George am See, a town of Germany, in the principality of Culmbach, seated on a lake, called the pond of Brandenburg; 24 miles N.E. of Bayreuth.

St. Georges des Sept Voies, a town of France, in the department of the Maine and Loire; 12 miles N.W. of Saumur.

St. Georges-du-Flecre, a town of France, in the department of the Eure, and chief place of a canton in the district of Pontaudemer; 25 miles N.W. of Evreux. The place contains 830, and the canton 11733 inhabitants, on a territory of 95 square kilometres, in 14 communes.

GEORGENBERG, a town of Silesia, in the principality of Oppeln; 40 miles E. of Oppeln. N. lat. 50° 30'. E. long. 18° 32'.

GEORGENFELD, St., a town of Saxony, in the circle of Erzgebirg; 18 miles S. of Hohn. N. lat. 50° 40'. E. long. 13° 44'.

GEORGENTHAL, a town of Saxony, in the principality of Gotha; 6 miles S. of Gotha.

GEORGENZELLS, a town of Germany, in the county of Heineberg; 5 miles S.S.E. of Salzungen.

GEORGE-TOWN, a town of America, being the chief and post-town of Suffolk county, in the state of Delaware, situated 103 miles S. of Philadelphia, containing about 30 houses, and lately made the seat of the county-courts.—Alfo, a post-town in Maryland, in Kent county, on the east side of Chesapeake bay, containing about 30 houses; 9 miles from the mouth of the river Susquehanna, 65 miles S.W. of Philadelphia.—Alfo, a post-town of Beaver county, Pennsylvania, on the S. E. side of Monongahela river, at the mouth of George's creek; 16 miles S.W. of Union. In this place are annually built many boats, for the trade and emigration to
to the western country.—Also, a post-town and port of entry in Montgomery county, Maryland, and in the territory of Columbia, pleasantly situated on a number of small hills, on the northern bank of Potowmac river, separated eastward by Rock creek from Washington city, and distant 4 miles from the capital, and 8 N. from Alexandria. The houses, which are about 390, are elegant and commodious. The Roman Catholics have established a college in this place, which is in a flourishing state. The town carries on a small trade with Europe and the West Indies; 64 miles S.W. by W. from Baltimore, and 148 S.W. from Philadelphia. N. lat. 38° 55'—Also, a town and township of Lincoln county, in the state of Maine, situated on both sides of Kennebee river; incorporated in 1716, and containing 1,534 inhabitants. It is entirely surrounded by navigable waters, excelling about two miles of land, which divides the waters of Winnagage creek, a part of the Kennebee, from an arm or influx of Cape bay, called Stephen’s river. This township contains about 28,000 acres of land, and salt-marsh. Upon this spot the European first attempted in 1606 to colonize New England. It is a part of what was called “Sagadahock;” and the patentes of the Plymouth company began here to lay the foundation of a great state. They sent over for this purpose a number of civil and military officers, and about 100 people. Several misfortunes obliged them to give up the settlement, and in 1668 the whole number who survived the winter returned to England. 

George-town is 15 miles S. of Powraborow, and 170 N. by E. from Bolton.—Also, a post-town of Georgia, in the county of Oglethorpe, 50 miles S.W. of Augusta, in the midst of a poor country, but indicating prosperity.—Also, a large maritime district in the lower country of South Carolina, situated in the N.E. corner of the State. Harvy and Marion districts have lately been taken from this territory, leaving 20,532 inhabitants, of whom 16,860 are slaves.—Also, a post-town, and port of entry, and capital of the last-mentioned district, situated on an isthmus over which several streams unite their waters, and form a broad water called “Winyawa” bay, 13 miles from the sea. It contains 3,040 dwelling-houses, built chiefly of wood. The public buildings are a court-house, gaol, and academy; four churches for Episcopalians, Baptists, Presbyterians, and Methodists respectively. The place carries on a small trade with the West Indies; 60 miles N.E. by N. from Charleston, and 681 from Philadelphia. N. lat. 33° 24'. W. long. 79° 35'.—Also, a town of Kentucky, on the Elk horn; 20 miles E. of Frankfort. N. lat. 38° 7'. W. long. 84° 50'.—Also, a town of New Brunswick, on the river St. John. N. lat. 45° 48'. W. long. 66° 12'.—Also, a town on the coast of the island of St. John, on the gulf of St. Lawrence.—Also, a town of the state of Georgia; 20 miles N. of Waynesboro.—Also, a town of Scotland, in Perthshire, with some barracks, at the end of Loch Rannock; 31 miles N.W. of Perth. N. lat. 56° 41'. W. long. 4° 25'.

GEOGIA, in Botany, Ehrhart Beitr. v. 1. 176, so named by that author after his majesty George III. king of Great Britain, when he embellished, as a new genus, the mols called by Linnaeus Arumum pellucidum. All botanists, nevertheless, have preferred the name Tetraphis, given by Hedwig. See FRIESE OF MUSES, n. 1. It seems, however, that there ought to be a Georgia after Georgi the Russian traveller and botanist. See GEOGNA.

GEORGIA, in Geography, a country of Asia, between the Cispijan and Black seas, and particularly appropriated to the territory that lies between the Cispijan sea and Mingrelia, anciently known by the name of “Iberia.” The ancient Iberia, which lies to the west, is now chiefly the “Immeretia” of European Turkey, on the other side of a branch of the Caucasus. Georgia, or more properly “Gurgtia,” including Daghestan and Schirvan, may be considered as constituting the Albania of the ancients; a name, however, that has been applied in different quarters to mountainous regions.

The whole country, which is known by the name of Georgia or Grumelii, is divided into two considerable Christian states. One of these, bounded by the Black sea, consists of the kingdom of “Immeretia,” and the principalties of “ Mingrelia” and “Guriel.” (which respectively) and is now governed by a common prince, who bears the title of czar or caesar. Each of these countries had formerly its own ruler, all acknowledging the supremacy of the Grand Sultan, till czar Solomon united them under his authority, and freed them from the paramount Ottoman. Solomon, having upon his accession forbidden the fraudulent traffic practised by the nobles of selling their peasants, greatly offended the Turks, who gained by that species of commerce. Being by their intrigues driven from his throne, and compelled to find an asylum in the woods and mountains, he lived like a wild man for sixteen years, in caverns and holes, and frequently, by his personal courage, escaped assassination, until he was re-instated in his dominions by the Russians. This prince, on ordinary occasions, was distinguished from his subjects by riding on an ass, perhaps the only one in Immeretia, and by wearing boots. He had no regular troops, but collected a defunct army of 6000 men, without artillery. These troops were drawn together by the sound of the trumpet; in other respects the prince’s orders were issued at the markets, which are held every Friday. One of his servants attended a tree near the place of meeting, and proclaimed the edict with a loud voice. His subjects were of the Greek religion. Solomon died of the plague in 1784, and was succeeded by his nephew David, who threw himself under the protection of Russia. In 1784 his emissaries were introduced to the empress at Petersburg, and, in the eastern style of homage, threw themselves on the ground at her feet.

The second Georgian state consists of the principalities of “Karduelia” or “Carduelia,” (Kartalnian) and “Kakhetty,” which have been long governed by Christian princes, in submission to the Perian empire, but, since the body snuffed out by the throne of the Sophs, have rendered themselves independent. Each of these two provinces formerly composed a distinct state; but they have both lately been reduced under the sole sovereignty of prince Heraclius of the Kakhetian dynasty. The state of Karduelia and Kakhetty borders northwards on the Kabastra, eastwards on Daghestan and Schirvan, (which respectively) southwards on the Perian Armenia, and westwards on Immeretia. The capital is Tiflis (which feat). The czar, or prince Herachus, who is celebrated for his bravery and other great qualities, as well as by the important part he acted during the disturbances that agitated Persia after the death of Tamas Kulf-Khan, submitted in the year 1783 to the Russian empire, thus voluntarily sacrificing an independence which he seemed to have secured by his exploits; but the advantages of which were richly compensated in the protection he procured by this submission. However, notwithstanding this close alliance with Russia, he was compelled in 1787 to renounce his connection with it, and to acknowledge himself tributary to the Porte; but he died soon afterwards. Within a few years past the Russian interest revived, and prevailed; and in February 1801, Georgia was by a public ukase united to that empire. The Georgians or Grumelians, as they are some-
times called, avoided all connivance with the Tartars, and have distinguished themselves as the most numerous and powerful body of the mountaineers of Caucasus, now for the greater part subject to the protecting authority of Russia. The inhabitants of Georgia, when it was one kingdom, were Christians, but since the year 1639, they were blended with Mahometans; the king of Persia having conquered and divided the country into two provinces or kingdoms, and having obliged the people to embrace the Mahometan religion. But since they have been under the protection of Russia, they have again avowed themselves Christians, following in part the rights of the Armenian, and in part those of the Greek church. They are represented as the most tractable Christians of the East. The Georgians excel in the use of the bow, and are reputed to be the best archers in Asia. The women are celebrated for their beauty, but though they are very handomely they love to adorn themselves with paint, and are not in high estimation for their modesty. As the country produces strong wine, the Georgians are addicted to intoxication, and the women, as well as the men, indulge freely in the use of brandy. The men, it is said, have no virtue but courage; father kill their children, and sometimes their wives. According to the laws of war in Turkey, any province which revolts is given up to pillage, and the inhabitants are reduced to slavery. In consequence of this custom, which prevails throughout Asia, Georgia and Circassia supply the market of Constantinople with slaves; though it is said, that the Circassians alone have the honour of being admitted into the bed of the sultan. This supply of female slaves is continually furnished by the Lutghe Tartars, who, situated between the Caffian and Black seas, between Georgia and Circassia, are perpetually at war with these two provinces. They carry over to the eastern coast of the Black sea the slaves they have taken, and sell them to the Turkish merchants, who come thither at stated times for this traffic. The inhabitants of this famine coast, likewise, seize on their countrymen in the neighbouring villages, and sell them; and children have been sometimes sold by their parents. See Circassia.

The air of Georgia is dry, very warm in summer, and very cold in winter. Fine weather commences in the month of May, and continues till the end of November. The soil is extremely fertile, provided the ground be watered. The bread and fruits are excellent; and the pastures feed a great number of cattle, fat and lean. The wine is of excellent flavour, and the wild hogs are delicate. The inhabitants make wine, which they fell into Armenia and Persia, especially to Iphalan, for the king’s table. Silk forms a considerable branch of trade to Erzeroum; though the inhabitants are unacquainted with the best method of winding it. In this province there are only four considerable towns; viz. Tiflis, Gori, Suren and Ali. See Persia.

Georgia, one of the United States of America, situated between 31° and 35° N. lat. and between 5° and 16° W. long.; extending in length about 600 miles, and in breadth 250; and bounded on the east by the Atlantic ocean; S. by East and West Floridas; W. by the river Mississipi; N.E. and N. by South Carolina, the Tennessee State, or by lands ceded to the United States by South Carolina. Its population is estimated, by the census of 1791, at 82,548 persons; of whom 29,264 were slaves; but the number has since been much augmented. The settlement of a colony between the rivers Savannah and Altamaha became the subject of contemplation in England in the year 1732, with a view to the accommodation of poor people in Great Britain and Ireland, and for the further security of Carolina. The benevolent and humane proposal to raise a fund for conveying indigent emigrants to this part of America, free of expense. Their generous project was encouraged by letters patent obtained from his majesty George II. in June 1732; and, in honour of the King, the new province was called “Georgia.” A corporation was established for settling the colony, which was to be separated from Carolina by the Savannah; and a large sum of money was raised for the purpose of carrying the liberal and humane design into execution. General Oglethorpe was selected for conducting the emigrants, about 116 in number, to their new abode; and soon after their arrival, in the commencement of the year 1733, they marked the spot, on which Savannah now stands, as the most proper for the foundation of their settlement. Accordingly they proceeded to erect a fort, and a number of small huts, for their defence and accommodation. A treaty of friendship was concluded between the settlers and their neighbours, the Creek Indians; and various regulations were framed, for their future government. The number of new settlers from the Highlands of Scotland and from Germany gradually increased; so that in the course of three years, Georgia received above 500 British subjects, and about 170 foreigners. Afterwards several adventurers from Scotland, Germany, and Switzerland followed their countrymen, and contributed to encourage the hopes of the trullers as to the permanence and prosperity of the colony. Several towns were built, and, in 1739, more than 300 people were employed in trading with the Indians for furs. Nevertheless, in 1741, the English government received information that scarcely a sixth part remained of the number of persons who had migrated to Georgia; and those that continued were so much discouraged, that they seemed to be defrains of fixing in a more favourable situation. It was thus found that the fylum of government, which had been formed for this colony, was highly injudicious and altogether inconsistent with its prosperity. The first use which the proprietors of Georgia made of the unlimited powers with which they were invested, was to establish a system of legislation that made them absolute masters, not only of the police, justice, and finances of the country, but even of the lives and estates of the inhabitants. As great inconveniences had been found to arise in other colonies from large polieishes, it was thought proper in Georgia to allow each family only 50 acres of land; which they were not permitted to mortgage, or to dispose of by will to their female issue. This half regulation, however, was such, as it made the males only capable of inheritance, was soon abolished; but other restrictions of a discouraging nature still remained. No man was permitted to leave the province without a licence. If any of the land granted by the trullers were not cultivated, cleared, and fenced round with a wooden fence, or MIile fix feet high, within 18 years from the date of the grant, such part was to revert to the trullers for the benefit of the colony. It was forbidden to use negroes, to import rum, and to trade with the Indians without a special licence obtained for this purpose. Under these restrictions the province languished, and the people complained; till at length the trullers, in the year 1752, surrendered their charter to the king, and it was made a royal government. From this time, till the peace of Paris in 1763, the province struggled under many difficulties, arising from the want of credit with friends, and from the frequent molestation of enemies. The good effects of this peace were feebly felt, and its annual exports, which in 1752 amounted to no more than about 10,000. florins, were very much augmented; and its population and agriculture proportionably increased; though under some checks and interruptions from disputes and wars with the Creek Indians. But since a treaty of peace and friendship with the Creek nation was concluded in 1750, the state of Georgia has been rapidly advancing in every kind of improvement.

Since.
G E O R G I A.

Since the revolution, Georgia has been divided into counties, comprehended under two districts, viz. the Upper and the Lower; the former includes 15 counties, viz. Montgomery, Washington, Hancock, Greene, Franklin, Oglethorpe, Elbert, Wilkes, Lincoln, Warren, Jefferson, Jackson, Bulloch, Columbia, and Richmond; the latter contains nine counties, viz. Beaufort, Glynn, Liberty, Chatam, Bryan, M'Intosh, Effingham, Screven, and Burke. The principal towns are Augusta, formerly the seat of government, Savannah, the former capital of the state. Sunbury, Brunswick, Frederica, Washington, and Louisville, which is the metropolis of the state, and where its records are deposited. The principal rivers which water Georgia, are Savannah, which separates it from South Carolina, Ogeechee, which runs parallel with the former, and Alatamaha, which runs parallel with the others. Besides these and their numerous branches, we might mention Tlice river, Little Stilla, Great Stilla, Crooked river, and St. Mary's, which forms a part of the southern boundary of the United States. The rivers in the middle and western parts, belonging to the "Georgia Western territory," will be noticed in another place. All these rivers contain a plentiful supply of various sorts of fish, as rock, mullet, whiting, flad, trout, dace, cat fish, whiting, brim and butter-fish; and the bays and lagoons afford oysters, and other shell fish. The chief lakes or marshes in this state, is Eufaula, called Lake Noseeumphenogaw, which is nearly circular. The eastern part of the state is bounded by the mountains and the ocean, and the rivers Savannah and St. Mary's, comprehending a tract of country more than 120 miles from N. to S., and from 50 to 80 E., and W., is level without a hill or slope. At the distance of about 40 or 50 miles from the sea-board, or salt-marsh, the land gradually rises to mountains. The chief chain of the Alleghanian or Appalachian mountains terminates in Georgia, 60 miles S. of its northern boundary. From the base of this mountain spreads a widely extended plain, of the richest soil, and in a latitude and climate well adapted to the culture of most productions either of the south of Europe or of the East Indies. In the low country, near the rice swamps, bilious complaints and fevers are very general during the months of July, August, and September; and at the approach of this sickly season, the rich planters, with their families, remove either to the sea-islands or to a more elevated situation, for the benefit of the air. In the winter and spring, pleurisy, peripneumonia, and other inflammatory disorders, produced by colds, which are frequent in Florida and the Carolinas, in Georgia, however, are mild and pleasant; snow is seldom seen, nor is vegetation interrupted by severe frosts. In the hilly country, commencing about 50 miles in some parts, and in others about 100 miles from the sea, the air is pure and fabulous, and the water good and abundant. From June to September the mercury in Fahrenheit's thermometer fluctuates from 76° to 90°; and in winter from 40° to 60°. The most prevailing winds are S.W. and E.; and in winter N.W. The E. wind, is warmest in winter and coolest in summer; the S. wind, in summer and autumn is damp, sultry, and infalubrious. In the S.E. parts of the state, the trade winds impart their agitation to the atmosphere, and serve to purify and melliorate it. In the lowlands rice is cultivated; and in the interior and hilly parts, wheat and Indian corn, and the other productions common to the northern states, are the objects of agricultural attention. Rice is at present the staple commodity of this state; and the other chief articles of produce are tobacco, wheat and indigo. Georgia also yields cotton, flax, corn, potatoes, oranges, figs, olives, peaches, &c. The forest consists of oak, hickory, blackberry, pine, cedar, &c. The whole coast is bordered with islands, of which the principal is Skidaway, Waiaaw, Offalaw, St. Catherines, Sapelo, Frederica, Jekyll, Cumberland, &c. These islands are surrounded by navigable creeks, between which and the main land is a large extent of salt-marsh at a medium four or five miles broad, fronting the whole state, and interfected with creeks, which admit a general inland navigation, between the islands and the main land, from the N.E. to the S.E. corners of the state. The entrances of rivers flowing between these islands, form capacious harbours from three to eight miles broad; communicating with each other by parallel salt creeks. The islands in their natural state are covered with pine, oak, hickory, live oak, and red cedar. The soil is grey, formed by a mixture of sand and black mould; and a considerable part of it is very rich, and yields, by cultivation, good crops of indigo, corn, cotton, and potatoes. The soil of the main land, adjoining the marshes and creeks, remarbles that of the islands; except that, which borders on the creeks and river that penetrate far into the interior of the country, and which furnishes the valuable rice swamps. The soil between the rivers, at a greater distance, changes from a grey to red colour; and still more remotely, into the mulatto kind, consisting of a black and red earth. This sort of land is generally strong, and yields large crops of wheat, tobacco, corn, &c. This soil is succeeded by sandy, black, and very rich. This mixture of different soils is uniform, and regular, intermixed with occasional veins of different sorts; and stretches, in the order above-mentioned, across this state nearly parallel with the sea-coast, and extends through the several states, nearly in the same direction, to the banks of Hudson river. The culture of cotton is now so much an object of attention in this state, as to afford a reasonable expectation, that the states of South Carolina and Georgia may, in a few years, be able to raise more than 10 millions of pounds annually for exportation. With proper attention, most of the tropical fruits would flourish in this state. The south-western part of this state, and the adjoining parts of E. and W. Florida, will, it is conjectured, at some future period, become the vineyard of America. The chief articles of export are rice, tobacco, indigo, fago, lumber, naval stores, leather, deer skins, snake root, myrtle and bees wax, corn, and live stock. The value, in sterling money, of the exports of Georgia in the year 1753, was 15,974; in 1772, 121,674; in 1791, value in dollars, 491,472; in 1792, 459,973; in 1793, 561,833; in 1794, 676,154; in 1795, 956,158; and in 1796, 1,804,952. In 1819, the total produce of this state was 28,546, and the number of American seamen was 11,237. In return for her exports, Georgia receives West India goods, teas, wines, clothing, and dry goods of all kinds, from the northern states, cheese, fish, potatoes, apples, cyder, and shoes. The imports and exports are principally to and from Savannah, which has a fine harbour, and is the chief emporium of the state. The disposition and character of the inhabitants, collected from various parts of the world, are very much diversified; they are charged with indolence, which is attributed partly to the relaxing heat of the climate, and partly to the want of motives, necessary for exerting industry; they are praised for their friendliness and hospitality to strangers. Their diversions are dancing, horse-racing, cock-fighting, and chiefly hunting. They are reproached with an addictedness to gaming.

The different religious sects of this state are Baptists, Methodists, Presbyterians, Episcopalian, Roman Catholics, Quakers, and Jews. The former are the two chief sects, and inhabit the upper part of the state. The Episcopalians and Presbyterians are about equal in number; and the Catholics and Jews have each of them one church. The civil con-
The constitution of Georgia was adopted and ratified by a convention of delegates from the people, on the 6th of May, 1798, and is founded upon a plan similar to the federal constitution of the United States. All legislative power is vested in two distinct branches, a Senate and House of representatives, both chosen by the people at large, and styled the General Assembly. The members of the Senate are chosen for the term of three years, and those of the House of representatives are chosen annually. The Senate consists of one member from each county, and the House of representatives of thirty-four members. The executive power is vested in the hands of a governor, who holds his office during two years. Freedom of the press and trial by jury shall remain inviolate, and all persons shall be entitled to the writ of "habeas corpus." All persons shall have the free exercise of their religion, without being obliged to contribute to the support of any religious profession but their own. In each county a superior court is held twice in every year, in which all causes, civil and criminal, shall be tried, those excepted, which may be subject to the federal court, or such as may by law be referred to inferior jurisdictions. The judges of the supreme court, and the attorney-general, shall have a salary established by law; and hold their commission for three years. In the administration of justice, this state is divided into two districts, called the upper and lower circuit; and there are only two judges appointed to sit in the superior court; each of these judges being appointed to try causes in each circuit. Besides the superior court, there is an inferior court, a court of common pleas established in each county, which sits twice in a year, with five judges, appointed by the legislature. The county courts have a jurisdiction of criminal causes, which can be tried only in the superior court. Besides these there are the sheriff's court, and courts held by the justices of the peace, in every part of the state. The literature of this state, which is yet in its infancy, is gradually advancing towards higher degrees of improvement. For this purpose a college is instituted at Augusta, with liberal endowments; and in subordination to this it is proposed to found academies in every county of the state. This institution is denominated the "University of Georgia." The funds for its support consist of land, consisting of valuable land, together with nearly 6000 acres in bonds, houses, and town lots in Augusta. Other property also, to the amount of 10000 lbs., has been set apart in each county for erecting and furnishing their respective academies. The fund originally designed to support the literary orphan school, founded by the Rev. George Whitfield, a few miles S. of Savannah, consists chiefly of rice plantations and negroes. On the death of the countess of Huntington, to whom Mr. Whitfield bequeathed this property as trustee, the legislature, in the year 1792, passed a law, vesting it in thirteen commissioners, with power to carry Mr. Whitfield's original design into execution; and in compliment to the countess, the feminary is denominated "Huntingdon college." The middle parts of this state are inhabited by the Muskogee or Creek Indians, the most numerous tribe of Indians within the United States. See Creeks.

The "Georgia Western Territory" consists of an extensive tract of land, a principal part of which belongs to, and is inhabited by the Creek, Checotah, Chickasaw, and Cherokee nations of Indians. It is washed by the Mississippi river on the west, and may be considered as extending eastward as far as the Appalachian and Flint rivers. It is intersected by a great number of streams, which run in every direction; the principal are the Yazoo, and Loofa Chitto, which discharge themselves into the Mississippi, Pearl, Pascagoula, Mobile, Alabama, Tombecokoe, Eficcambin, and Chatta Hatches, which fall into the gulf of Mexico; and the Tennessee Bend, with Chucarana river, which falls into it from the fork of it, water its northern part. Twenty millions of acres of this territory was sold in consequence of an act of the legislature, passed in 1755, to certain companies; and the purchase money, amounting to 500,000 dollars, was paid into the state treasury. This land was afterwards sold at an advanced price, by the original purchasers, to various persons, principally of the middle and eastern states. This transference produced a great degree of discontent; but the ferment has since subsided; and the termination of the dispute has been a general satisfaction on the part of the purchasers, that the discordant proceedings of the legislature cannot affect their title, which they conceive to be good against all claims on the part of Georgia. Morde.

Georgia, New, or South Georgia, an island in the South Atlantic ocean, discovered by La Roche in 1675, seen by Mr. Guyot, in the ship Lion, in 1756, and more particularly described by Captain Cook, who explored it with attention in 1775, described its extent and true position, and named it Georgia, in honour of his majesty. It is situated between 33° 57' and 34° 54' S. lat., and between 88° 45' and 85° 34' W. long. It extends S. E. by E. and N. W. by W., in that direction is 31 leagues long, and its greatest breadth is about 15 leagues. It seems to abound with bays and harbours, especially on the N. E. coast; but they are rendered inaccessible for the greatest part of the year by the vall quantity of ice; or, at least, it must be dangerous lying in them, on account of the breaking up of the ice-cliffs, by which the coast is bounded, and which rise up perpendicularly in malleys of very considerable elevation. When these fall they float about in the seas like detached islands, and in falling make a noise like that of a discharged cannon. The inner parts of the country exhibit an appearance no less savage and horrible than the coast. The rocks raised their lofty summits, till they were lost in the clouds, and the valleys lay covered with everlasting snow. The lands, or rather rocks, bordering on the sea coast, were not covered with snow like the inland parts. The rocks seemed to contain iron. They are of blackish horizontal slate, probably approaching to hornblende. Not a tree was to be seen, nor a shrub even big enough to make a toothpick. The only vegetation that could be seen was that of a low stinging-bladed grass growing in tufts, wild burnet, and a plant like moss, which springs from the rocks. Seals or sea-lions were numerous, but smaller than those at Staten Land. Several flocks of penguins of a large size were observed, and besides the albatrosses, common gulls, and that fort called by Cook Port Egmont hens, terns, flags, divers, the new white bird, and a small bird like the pheas of the Cape of Good Hope, called yellow birds, which were found to be most delicious food. All the land birds that were seen consisted of a few small larks; but our navigators found no quadrupeds. The dung of one was seen, supposed to have belonged to a fox or an animal of that kind. On the whole coast our voyagers observed neither a river nor a stream of fresh water. They thought it highly probable, that the country has no perennial springs; and that the interior parts, as being much elevated, never enjoy heat enough to melt the snow in such quantities as to produce a river or stream of water. The coast alone receives warmth sufficient to melt the snow, and this only on the N. E. side; for the other, besides being exposed to the cold southerly winds, is in a great degree deprived of the sun's rays by the uncommon height of the mountains. On the approach of our navigators to Georgia, they first discovered an island in S. lat. 54° and W. long. 35° 23', which was called "Willis's island," which was a high rock of no great extent: East of this, between it and the main, they obser-
ed another island, to which, on account of the number of birds they saw upon it, they gave the name of "Bird Island." This island is of larger extent than the former, lies close to the N. E. point of the main land, which was called "Cape North." After having cleared the passage between these two islands, they pursuèd their coasting voyage to "Cape Buller," and at length arrived at a bay, which they denominated "Polefield bay," situated in S. lat. 54° 5', W. long. 37° 18', 11 leagues E. of Cape North. The land in which this bay lies, was at first judged to be part of a great continent; but upon coasting round the whole country, it was found to be an island, about 70 leagues in circuit. Between this bay and Cape Buller lies the "Bay of Isles," so called on account of several islands lying in and before it. The next projecting point was called "Cape Saunders," and beyond this is a large bay, which was named "Cumberland Bay." The next projecting land, which was an island appearing to be the extremity of the coast to the east, was called "Cape Charlotte," and on the west side of it lay a bay, which was named the "Royal Bay," the W. point of it being called "Cape George." These two capes are distant from each other six leagues. The island above mentioned, distant in the direction of S. by E. eight leagues from Cape Charlotte, was denominated "Cooper's Isle," which is a rock of considerable height, about five miles in circuit, and one mile from the main. The coast between them forms a large bay, named "Sandwich Bay." At Cooper's Isle the main coast takes a S. W. direction for the space of four or five leagues to a point which Capt. Cook called Cape Disappointment. Off this are three small islands, the southernmost of which is green, low, and flat, and lying one league from the Cape. Advancing towards the S. W., land opened beyond the Cape, which proved to be an island, and was called "Pickerel Fall island." In failing round this island, our navigators were almost continually involved in a thick mist, which led them to apprehend that they might be surrounded with dangerous rocks.—Cook's Second Voyage, vol. ii.

GEORGIA, a township of America, in the state of Vermont and county of Franklin, containing 8668 inhabitants. It is situated on Lake Champlain, opposite to the north end of South Hero island, and joins Milton on the south and St. Albans on the north. The river La Moille traverses the S. E. corner of this township.

GEORGIA, Gulf of, a large gulf of the North Pacific ocean, between the continent of North America and Quadra and Vancouver's island; about 120 miles in length from north to south; the breadth varying from 6 to 20 miles. It contains several clusters of islands, and branches off into a great number of canals, most or all which were examined by Capt. Vancouver and his officers.

GEORGIAN PLANET, or GEORGIAN SOLAR, in Astronomy, the name given by Dr. Herchel, the discoverer, to the seventh primary planet of the solar system. It is now generally known, particularly on the continent, by the name of Uranus.

This planet was discovered by Dr. Herchel on the 13th March, 1781. It is supposed that other astronomers have observed it, and inserted it in their catalogues as a fixed star. But Dr. Herchel, when he first saw it, was struck with its appearance, which seemed to differ from that of the neighbouring small stars. He happened to be accidentally engaged in examining the small stars near the feet of Gemini, and he observed one considerably larger than the rest, but it being quite so brilliant, he suspected that it might be a comet; in consequence of which he observed it with different magnifying powers, from 277, with which he discovered it, to 2010, and found that its apparent magnitude increased in proportion, contrary to what takes place in the fixed stars. He therefore measured its distance from some of the neighbouring fixed stars, and comparing its distance for several nights he found that it moved at the rate of about 213 in an hour. Dr. Herchel wrote immediately to the Royal Society, that other astronomers might join in observing it; upon which it was found and observed by Dr. Maskelyne, who almost immediately declared that he suspected it to be a planet; and on April 1, he wrote an account of this discovery to the astronomers at Paris, so that it was soon observed by all the astronomers in Europe. Mr. Lexell was then in England, and applied himself to compute the orbit upon the supposition that it was a comet; he therefore, according to the usual manner in such a case, supposed the orbit to be a parabola, and ascertained several perihelion distances, 6, 8, 10, 11, 12, 14, 16, and 18 times the earth's distance from the sun, and found that any perihelion distance between 14 and 18, would answer very well to the observations. Boscovich printed a memoir on the subject, in which he shewed that there were four different parabolas in which a body might move, and yet the computed places would agree with the observations which had then been made. Other astronomers, however, found that a circular orbit, whose radius was about 18 times the distance of the sun from the earth, would agree better with the observations; and confirmed Dr. Maskelyne's opinion that it was a planet. Upon the supposition, therefore, of a circular orbit, M. de la Lande proceeded to investigate its magnitude from the following observations. Mem. de l'Acad. Roy. des ScL 1779.

<table>
<thead>
<tr>
<th>Time of observation</th>
<th>April 25, 1781, at 9° 47'</th>
<th>July 31, 1781, at 15° 33'</th>
<th>Dec. 12, 1781, at 10° 10'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right ascension observed</td>
<td>2° 25' 15' 27&quot;</td>
<td>3° 10' 7' 49&quot;</td>
<td>3° 10' 23' 31&quot;</td>
</tr>
<tr>
<td>North declination observed</td>
<td>23 35 34</td>
<td>23 40 25</td>
<td>23 42 47</td>
</tr>
<tr>
<td>Longitude</td>
<td>2° 25 39 17</td>
<td>3 1 2 7</td>
<td>3 1 16 28</td>
</tr>
<tr>
<td>Latitude, north</td>
<td>11 36</td>
<td>12 24</td>
<td>14 54</td>
</tr>
<tr>
<td>Nutation in longitude</td>
<td>+ 10</td>
<td>+ 8</td>
<td>+ 7</td>
</tr>
<tr>
<td>Aberration in longitude</td>
<td>+ 19</td>
<td>+ 21</td>
<td>- 18</td>
</tr>
<tr>
<td>Sun's longitude from the mean equinox</td>
<td>1 5 58 53</td>
<td>9 7 13</td>
<td>8 21 21 50</td>
</tr>
<tr>
<td>Log. of the sun's distance</td>
<td>0.003196</td>
<td>0.006272</td>
<td>0.0092993</td>
</tr>
</tbody>
</table>
From these data, M. de la Lande calculated the elements of a circular orbit; but it having been found that the motion did not agree with any possible circle, it became necessary to calculate the elements of an elliptic orbit. When a sufficient number of oppositions had been observed for this purpose, professor Robison of Edinburgh undertook this investigation, a full account of which is given in Edinb. Trans. vol. I. 1788. The observations on which this investigation is founded are as follows:

<table>
<thead>
<tr>
<th>True Time at Edinburgh</th>
<th>Longitude</th>
<th>N. lat.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 21, 1781, 17' 44' 35&quot;</td>
<td>5° 0' 52' 11&quot;</td>
<td>15° 7'</td>
</tr>
<tr>
<td>26, 1782, 8° 36' 56&quot;</td>
<td>3 5 20 29</td>
<td>18 56</td>
</tr>
<tr>
<td>31, 1783, 0° 46' 24&quot;</td>
<td>3 9 50 52</td>
<td>22 10</td>
</tr>
<tr>
<td>Jan. 3, 1785, 17° 28' 56&quot;</td>
<td>3 14 23 2</td>
<td>25 40</td>
</tr>
<tr>
<td>8, 1786, 10° 39' 51&quot;</td>
<td>3 18 57 5</td>
<td>28 52</td>
</tr>
</tbody>
</table>

From which the following elements were obtained:

Mean distance 19,082.47
Eccentricity 0.0006
Periodic time 83,359 years
Mean anomaly at the 7th opposition 4° 0' 32" 51"
Long. of aphelion | | 11 23 9 51 |
Long. of the node 31, 1783. 2 12 40 14
Inclination of the orbit 0 40 25
Equation of the centre 5 26 56 6

The elements, as given by La Place, are as follows:

| Sidereal revol. | | 84 29 0 0 0 |
| Scl. maj. axis or mean distance | | 19,183,620 |
| Proportion of eccentricity of semi maj. | | 0.046683 |
| Axis for beginning of 1750 | | |
| Secular variation (—indicates diminution) | | ——0.000026228 |
| | | Deg. Min. Sec. |

Mean longitude at beginning of 1750 228 33 53 6
Long. of perihelion 1750 2 166 36 48 8
Sidereal and secular motion of perihelion | | 0 4 6 1 |
Inclination of orbit to ecliptic 1750 0 46 26.0
Secular variation of inclination of orbit to true ecliptic 0 0 3.0
Long. of ascending node on ecliptic 1750 72 37 52.8
Sidereal and secular motion of node on true ecliptic 0 57 16.2

The diameter of this planet is about 44 times that of the earth, or 35,112 English miles nearly. When seen from the earth, its apparent diameter, or the angle which it subtends at the eye, is 3° 5; and its mean diameter, as seen from the sun, is 4°. As the distance of the Georgian from the sun is twice as great as that of Saturn, it can scarcely be distinguished by the naked eye. When the sky however is clear, it appears like a fixed star of the sixth magnitude with a blue-white light, and a brilliancy between that of Venus and the Moon; but with a power of 200 or 300, its disc is visible and well defined. Its arc of retrogradation is 3° 36', and the duration of its retrograde motion 151 days.

This planet is accompanied by fix satellites, all of them discovered likewise by Dr. Herschel. The two first, which he saw for the first time in the month of Jan. 1787, proved afterwards to be the second and fourth, the others were discovered some few years later.

The most remarkable circumstance attending these satellites is, that they move in a retrograde direction, and revolve in orbits nearly perpendicular to the ecliptic, contrary to the analogy of the other satellites, which phenomenon is extremely discouraging when we attempt to form any hypotheses relative to the original cause of the planetary motions.

According to La Place, if we take for unity the semidiameter of the planet, equal to 1° 49, supposing it at the mean distance of the planet from the sun, the distance of its satellites will be as follows:

| I. | 13.120 |
| II. | 17.022 |
| III. | 19.845 |
| IV. | 22.752 |
| V. | 45.507 |
| VI. | 91.608 |

And the duration of their sidereal revolutions

<table>
<thead>
<tr>
<th>D.</th>
<th>Days, hrs. min. sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>5.8926</td>
</tr>
<tr>
<td>II.</td>
<td>8.7068</td>
</tr>
<tr>
<td>III.</td>
<td>10.0611</td>
</tr>
<tr>
<td>IV.</td>
<td>13.4559</td>
</tr>
<tr>
<td>V.</td>
<td>38.0750</td>
</tr>
<tr>
<td>VI.</td>
<td>107.6044</td>
</tr>
</tbody>
</table>

La Place conceives that the first five satellites of the Georgian may be retained in their orbits by the action of its equator, and the sixth by the action of the interior satellites; hence he concludes that the planet revolves about an axis very little inclined to the ecliptic, and that the time of its diurnal rotation cannot be much less than that of Jupiter and Saturn.

Use of the Tables.—The general construction of this kind of tables will be explained under Planet. The manner of calculating the mean longitude of the planet is as follows. Vince's Astronomy, vol. iii.

From Table I. take out the mean longitude, the aphelion, and node, together with the arguments I., III., IV., V., VI., VII., VIII., and place them in an horizontal line. But if the given year be not found in that table, take the nearest year preceding the given year as an epoch, and take out as before.

Under which, from Table II., place the mean motion in longitude of the aphelion and node, with the arguments answering to the number of years elapsed since the epoch, to the given year.

Under these write down (Table III.) the mean motions of the same, for the given month.

Under these write down (Table IV.) the mean motions of the same, for the given day of the month.

Under these write down (Table V.) the mean motions of the same, for hours and minutes.

Add together the numbers in the several columns, rejecting twelve signs, or any multiples thereof, if they occur; and in the arguments, rejecting 10,000 in the arguments IV., VI., and 1000 in the arguments I., III., V., VII., VIII., or any multiples thereof, and you get the mean longitude, the aphelion, and node, and the arguments for the given time.

From the mean longitude of the Georgian subtract the longitude of the aphelion, and you have argument I., or mean anomaly.

With argument I. take out the equation of the orbit in Table VI., together with the secular variation, with their proper signs, except the time be before 1780, in which case the secular variation is to be taken out with a contrary sign, making a proportion for the minutes and seconds of the argument, and you first get the equation; and doing the same for the secular variation, you get the secular variation; then, say, 100: the number of years from 1780 to the given time
GEORGium Sidus.

:secular variation above found: secular variation required.

Before 1780 the secular variation must be taken with a sign contrary to that found in the table. With argument II. take out the equation in Table VII., making a proportion in this and in the following equations, for the intermediate numbers of the arguments. With argument III., take out the equation in Table VIII. With argument IV. take out the equation in Table IX. With argument V. take out the equation in Table X. With argument VI. take out the equation in Table XI. With argument VII. take out the equation in Table XII. Take the sum of all these equations, regard being had to the signs of the first equation, and of the secular variation, the signs of the others being positive; and from it subtract 7'20", and you get the value of these eight equations; and this applied with its proper sign to the mean longitude already found gives the longitude of the Georgian in his orbit.

Example.—To find the heliocentric Latitude and Longitude of the Georgian, on Nov. 26, 1789, at 16° 14', mean Time at Greenwich.

<table>
<thead>
<tr>
<th>Epoch for 1789</th>
<th>Longitude</th>
<th>Aphelion</th>
<th>Node</th>
<th>Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 26</td>
<td>S. D. M. S.</td>
<td>S. D. M. S.</td>
<td>S. D. M. S.</td>
<td>II.</td>
</tr>
<tr>
<td>1789</td>
<td>4 12 41.4</td>
<td>11 17 11</td>
<td>8 18</td>
<td>12 48 5</td>
</tr>
<tr>
<td>16' 26' 14'</td>
<td>3 34 39.8</td>
<td>18 21.6</td>
<td>28.2</td>
<td>4 1 13</td>
</tr>
<tr>
<td>Sum</td>
<td>5 10 6 11.4</td>
<td>11 17 11</td>
<td>56 2</td>
<td>12 48 10</td>
</tr>
<tr>
<td>Sum of eight equations</td>
<td>-3 21 45.5</td>
<td>4 10 6 11</td>
<td>4 6 44 26</td>
<td></td>
</tr>
<tr>
<td>Longitude in orbit</td>
<td>4 6 44 25.9</td>
<td>4 22 54 14</td>
<td>12 3 36 7</td>
<td>Arg. I.</td>
</tr>
<tr>
<td>Reduction</td>
<td>- 8.9</td>
<td>Arg. I.</td>
<td>Arg. IX.</td>
<td></td>
</tr>
<tr>
<td>Heliocentric longitude</td>
<td>4 6 44 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heliocentric latitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secular variation</td>
<td>+ 0 0.7</td>
<td>Arg. II.</td>
<td>Arg. III.</td>
<td>Arg. IV.</td>
</tr>
<tr>
<td>-3'26'59&quot;.6</td>
<td>+ 0 0.7</td>
<td>Arg. II.</td>
<td>Arg. III.</td>
<td>Arg. IV.</td>
</tr>
<tr>
<td>-0.2 2'54&quot;.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This is the true heliocentric longitude from the mean equinox; and if we want it from the true equinox, we must apply the equation of the equinoxes.

In this operation the first five lines are taken out immediately from the tables, and the sums of all the columns give the mean longitude of the aphelion, the node, and the arguments for the given time. Argument I. is immediately found, according to the rule, the equation to which is thus found. The equation (Table VI.) for 4 22° is -3 26 59°.6, and the variation or 60° is 4'31".3; hence 60°: 54°: 15°: 31°: 4°: 5°: 7° 45°: 9°; which (as the equation is decreasing) subtracted from -3'26'59°.6 gives -3'22'54°.5, the equation required. And to find the secular variation, that variation is +7°.44 for 4 22°, and it decreases c°.16 for 60°; hence 60°: 54°: 15°: 31°: 4°: 5°: 7° 45°: 9°. With argument II, 638, take the equation from Table VII. Now the equation for 630 is 4°.7, and it changes c°.7 for 10; hence 10: 8: c°.7: c°.6, which as the equation
GEORGIIUM SIDUS.

Epochs of the mean Longitude of the Planet, with the Arguments of the Equations.

<table>
<thead>
<tr>
<th>Years</th>
<th>Mean Longitude of the Georgian</th>
<th>Aphelion</th>
<th>Node</th>
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</thead>
<tbody>
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<td>B. 1680</td>
<td>S. D. M. S.</td>
<td>17 41 1.4</td>
<td>11 15 35 13</td>
</tr>
<tr>
<td>C. 1700</td>
<td>B. 1680</td>
<td>2 12 19 34</td>
<td>9 30 5.5</td>
</tr>
<tr>
<td>C. 1700</td>
<td>2 12 22 11</td>
<td>12 24 3 9</td>
<td></td>
</tr>
<tr>
<td>C. 1720</td>
<td>2 12 24 48</td>
<td>16 10 2 5</td>
<td></td>
</tr>
<tr>
<td>C. 1740</td>
<td>2 12 30 2</td>
<td>21 6 8 6.8</td>
<td></td>
</tr>
<tr>
<td>C. 1756</td>
<td>2 12 35 10</td>
<td>16 28 1</td>
<td></td>
</tr>
<tr>
<td>B. 1760</td>
<td>2 12 39 27</td>
<td>16 42 6</td>
<td></td>
</tr>
<tr>
<td>B. 1769</td>
<td>2 12 40 30</td>
<td>16 45 37</td>
<td></td>
</tr>
<tr>
<td>B. 1772</td>
<td>2 12 42 51</td>
<td>16 53 32</td>
<td></td>
</tr>
<tr>
<td>B. 1780</td>
<td>2 12 45 44</td>
<td>17 3 13</td>
<td></td>
</tr>
<tr>
<td>B. 1790</td>
<td>2 12 48 21</td>
<td>17 12 1</td>
<td></td>
</tr>
<tr>
<td>C. 1800</td>
<td>2 12 50 58</td>
<td>17 20 49</td>
<td></td>
</tr>
<tr>
<td>B. 1812</td>
<td>2 12 53 35</td>
<td>17 29 37</td>
<td></td>
</tr>
<tr>
<td>B. 1817</td>
<td>2 12 54 6</td>
<td>17 30 30</td>
<td></td>
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<tr>
<td>B. 1818</td>
<td>2 12 54 22</td>
<td>17 31 23</td>
<td></td>
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<td>B. 1819</td>
<td>2 12 54 37</td>
<td>17 33 9</td>
<td></td>
</tr>
<tr>
<td>B. 1820</td>
<td>2 12 54 37</td>
<td>17 34 1</td>
<td></td>
</tr>
<tr>
<td>B. 1821</td>
<td>2 12 54 53</td>
<td>17 34 54</td>
<td></td>
</tr>
<tr>
<td>B. 1822</td>
<td>2 12 54 53</td>
<td>17 35 47</td>
<td></td>
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<tr>
<td>B. 1823</td>
<td>2 12 55 14</td>
<td>17 36 40</td>
<td></td>
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<tr>
<td>B. 1824</td>
<td>2 12 55 40</td>
<td>17 37 33</td>
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<tr>
<td>B. 1825</td>
<td>2 12 56 12</td>
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The table continues with entries for subsequent years.
### Table II. Mean Motion of the Planet for complete Julian Years.

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<th>Aphelion</th>
<th>Node</th>
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<td>4 17 44.2</td>
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<tr>
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<td>4 35 28.4</td>
<td>1 46</td>
<td>0 0 31</td>
</tr>
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<td>4 53 12.6</td>
<td>2 38</td>
<td>0 0 47</td>
</tr>
<tr>
<td>4</td>
<td>0 17 11 39.2</td>
<td>3 31</td>
<td>0 0 1 3</td>
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<td>0 0 1 8</td>
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<tr>
<td>6</td>
<td>0 25 47 7.5</td>
<td>5 17</td>
<td>0 0 1 34</td>
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<tr>
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<td>1 4 23 18.1</td>
<td>7 2</td>
<td>0 0 2 6</td>
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<td>1 8 41 2.6</td>
<td>8 7 55</td>
<td>0 0 2 21</td>
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<tr>
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<td>1 12 58 46.8</td>
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<td>0 0 2 37</td>
</tr>
<tr>
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<td>1 17 16 31.0</td>
<td>10 9 41</td>
<td>0 0 2 53</td>
</tr>
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<td>1 21 34 57.5</td>
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<td>0 0 3 8</td>
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<td>0 0 3 55</td>
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</tr>
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### Table III. Mean Motion for Months.

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<th>Months</th>
<th>Mean Longitude</th>
<th>Aphelion</th>
<th>Node</th>
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<td>January</td>
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<tr>
<td></td>
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</tr>
<tr>
<td>February</td>
<td>21 53.4</td>
<td>4 1</td>
<td>2 1  6</td>
</tr>
<tr>
<td>March</td>
<td>41 3.7</td>
<td>9 2</td>
<td>4 2  12</td>
</tr>
<tr>
<td>April</td>
<td>1 3 33.1</td>
<td>13 4</td>
<td>6 2  17</td>
</tr>
<tr>
<td>May</td>
<td>1 24 44.2</td>
<td>17 5</td>
<td>3 3  17</td>
</tr>
<tr>
<td>June</td>
<td>1 46 37.5</td>
<td>22 6</td>
<td>9 4  22</td>
</tr>
<tr>
<td>July</td>
<td>2 7 48.6</td>
<td>26 8</td>
<td>11 5  22</td>
</tr>
<tr>
<td>August</td>
<td>2 29 42.0</td>
<td>31 9</td>
<td>13 6  22</td>
</tr>
<tr>
<td>September</td>
<td>2 51 35.4</td>
<td>35 10</td>
<td>15 7  22</td>
</tr>
<tr>
<td>October</td>
<td>3 12 49.4</td>
<td>39 12</td>
<td>17 8  22</td>
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<tr>
<td>November</td>
<td>3 34 39.8</td>
<td>44 13</td>
<td>18 8  22</td>
</tr>
<tr>
<td>December</td>
<td>3 55 50.8</td>
<td>48 15</td>
<td>20 9  22</td>
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### GEORGIIUM SIDUS.

#### Table IV.—Mean motion for Hours and Minutes.

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#### Table V.—Mean motion for the Days of the Month.

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In the Bilextiles a day must be subtracted for the months of January and February.
Table VI.

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Arg. I = (Mean long. — aphelion) or mean anomaly.

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**Vol. XVI.**
**GEORGIMUM SIDUS.**

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3
GEORGIIUM SIDUS.

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Vol. XVI.
GEORGUM SIDUS.

Table XVII.

Reduction to the Ecliptic and Logarithm of the Cosine of the heliocentric Latitude.

Arg. IX., or Argument of Latitude.

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GEORGIAN Bible. See Bible.

GEORGIAN Monks and Nuns, are religious of Georgia, in Aria, who follow the rule of St. Basil.

GEORGIANA, in Geography, a name originally given to a tract of country in the province of Maine, in North America.

GEORGIC, something that relates to the culture or tilling of the ground.

The word is borrowed from the Latin geucricus; and that of the Greek γεωργικός, of γῆ, terra, earth; and γεωργίαν, ope, I work, labour, of γῆς, opis, work.

The Georgics of Virgil are four books composed by that poet on the subject of agriculture.

GEORGIEV, in Geography, a town of Ruffia, in the government of Caucasus; 32 miles W.N.W. of Ekaterinograd.

GEORGINA, in Botany, so named by Willdenow in honour of Professor Georgi; see GEORGIA and DAHLIA.

We have retained the latter name, given by Cavanilles, for this fine genus, because it has been universally adopted in this country, where the various species seem likely to come into general cultivation. A change in such a cafe not only shocks vulgar prejudices and il!iterate indolence, but is materially inconvenient.

GEORGIUS, in Geography, a town of Walachia; 18 miles N.N.E. of Bucharest.

GEOGRAPHY, a kind of knowledge of the nature and qualities of the ground or soil, gained by viewing and considering it.

The word is formed of the Greek γη, earth, and γνωρίς, 1 see, view.

Geography is only conjectural; but its conjectures are very well grounded.

GEOSTATICS. See Statics.

GEPHRUS, in Ancient Geography, a town of Syria, according to Polybius, which surrendered to Antiochus.

GEPHYRA, a town of Syria, in the Seleucid territory, according to Ptolemy; 22 miles from Antioch.

Allo, a town of Africa, according to Polybius, in the vicinity of Carthage, situated on the bank of the river Macaras.

GEPHYRÆI, a people mentioned by Herodotus, who were probably natives of Gephyra in Syria; they migrated with Cadmus into Boeotia, where they occupied the territory of Tanagra; but on being driven from thence by the Boeotians, they took refuge in Attica.

GEPIDE, a people of Scandinavian origin, of whose Gothic extraction Jornandes gives the following account: the Goths, leaving Scandinavia under the conduct of king Barith, put to sea with only three ships. One of these, falling lower than the other two, was thence called "Gepants," signifying in the Gothic tongue flow: and hence the name of Gepantae and Gepide, which was at first given them as an appellation of reproach. Procopius likewise expressly affirms, that the Goths, the Vandals, the Visigoths, and the Gepide, were originally the same nation; that they had the same customs, manners, religion, and language; and that they only differed in names, borrowed, perhaps, he says, from their different leaders. They entered Scythia with the other Goths, and settled in the neighbourhood of the Tanais and Palus Marotis. There they continued till the reign of Arcadius and Honorius, when, their number being greatly increased, they approached the Danube, and having afterwards crossed that river, dwelt in the neighborhood of Singidunum and Sirmium, about the year 400, where they still were when Procopius wrote his history. They had kings of their own, and formed a distinct nation, separate from both the Ostrgoths and Visigoths; but perhaps not one from the Lombards, who were afterwards masters of Italy. Under their king Faﬁlida, they gained a complete victory over the Burgundians about the year 245; and Faﬁlida, dated with this victory, laid waste the territories of the Goths, whose sovereign Ottagothus refused to grant them land for their accommodation. Being defeated by the Goths, they afterwards joined them, and other northern nations, in the irruption which they made with their united forces into the empire in the second year of the reign of Claudius; but they were defeated by that prince with great slaughter. In the year 279 Probus granted them lands in Thrace, upon promise of their quiet submission; but whilst the emperor was engaged in war in the East, they seized the neighbouring provinces, and were cut off in great numbers by Probus after his return. St. Jerom mentions the Gepide among the other nations of Barbarians, who, in 407, invaded Gaul, and overran its provinces. Attila afterwards subdue them, and in 451 they served under him in his famous expedition into Gaul. Upon the death of Attila, the Gepidæ shook off the yoke under the conduct of their king Ardicæ, who obtained a complete victory over the Hunns; in consequence of which the Gepide not only recovered their ancient liberty, but gained possession of ancient Dacia, N. of the Danube, which they had been driven by Attila. They then entered into an alliance with the Romans, who agreed to pay them an annual pension. Having obtained possession of part of Illyricum, with the city of Sirmium, they continued quiet till the year 537, when, on account of their joining the Heruli, and plundering the neighbouring provinces, they were compelled by Julianus, after several encounters, to abandon Illyricum, and to content themselves with Dacia beyond the Danube. In the year 552, a quarrel arose between the Gepide and the Lombards; but the latter, having obtained a reinforcement from Julianus, attacked the former, and gave them a total overthrow. This defeat was followed by a peace between the two nations, which was brought about by the mediation of Julianus.

The peace, however, was of short duration. Under their respective sovereigns, viz. Cunimandus, king of the Gepidæ, and Alboinus, king of the Lombards, they commenced mutual hostilities; and determined to abide by the issue of a single battle. The contest was very severe, and remained for some time very doubtful; but at last, the Gepide were put to flight, and pursued by the victorious Lombards with such slaughter, that few only were left alive of the numerous multitude that had engaged. After this victory, the Lombards fixed the whole of Dacia, and obliged the Gepide either to submit, or to retire. Henceforth they had no king of their own, but lived in subjection either to the Lombards, who were masters of their country, or to the princes of the neighbouring nations, especially the Huns, settled in Pannonia. Thus their kingdom terminated in the year 572, Julianus, the successor of Julianus, being then emperor.

GEPE, in Geography, a river of Germany, which rises near Neublat in the county of Mark, and runs into the Bigger, two miles N. of Olpe, in Westphalia.

GER, Cape. See AGUER.

GERA, a town of Saxony, in the Vogtland, on the Elbe; 30 miles S.S.W. of Laepice. N. lat. 50° 49'. E. long. 13° 6'.—Allo, a town of Italy, in the department of the Upper Pa.—Allo, a river of Germany, which runs into the Unstrull, six miles N. of Erfurt.

GERA, in Ancient Geography, a town of Arabia. Ptolemy.

GERÆA, a town of Lyctania. Ptolemy.
GERÆSTIUM, a country of the Peloponnesus, in Arcadia.

GERÆSTUS, a town and port of the island of Euboea, upon the S.W. coast, about 15 miles from Carytis; now Gerefto.

GERALTINGEN, in Geography, a town of Switzerland, four miles S.E. of Soleure.

GERANDRUM, in Ancient Geography, a town of the island of Cyprus.

GERANGER, in Geography, a town of Norway, in the diocese of Drothem; 22 miles S.S.W. of Romdal.

GERANIA, in Botany, the 73d natural order in Jussieu's system, or the 13th of his 13th class. The following is his definition of this, one of his most important and extensive classes. Cotyledons two. Petals many, Stamens inserted below the germin.——The Calyx is of one or many leaves, very rarely deficient. Petals hypogynous, or inserted below the petal, definite in number, very rarely indefinite, for the most part distinct, but sometimes connected at the base, into a fort of false monopetalous corolla; they are rarely wanting. Stamens inserted below the petal, definite or indefinite, the filaments often distinct, sometimes united all or some of them into one tube, more rarely collected into several bundles; authors distinct, or united only in Valsa and Impatiens (called Balsamina by Jussieu). Germin superior, in many simple, in some multiplied; style single, or multiplied, or deficient; stigma one, or several. Fruit superior, sometimes simple, of one or many cells; sometimes, but more rarely, multiplied, each pericarp of one cell.

The order of Geranium is thus defined by Jussieu. Calyx simple, either of five leaves, or of one deeply five-cleft, permanent. Petals five. Stamens definite, their filaments united at the base, sometimes all fertile, sometimes part of them abortive. Germin simple; style one; stigma five, oblong. Fruit either of five cells, or of five capsules, each cell or capsule containing one or two seeds. Corollum without a perianth, or (allbum). Stem either somewhat fleshy, or herbaceous. Leaves with stipules, opposite or alternate. Flowers, in the former case, opposite to each leaf; in the latter, axillary.

Jussieu enumerates only two genera as properly belonging to this order, Geranium, which includes Erodium and Pelargonium, justly separated from that genus by the late M. L'Héritier; see Erodium: and Monanthes, which is but too nearly akin to Geranium. He subjoins three genera as related to this order; Tragopogon, whose affinity is very obscure; Impatiens (his Balsamina), which is perhaps still less akin to it; and Oxalis, which last we would rather refer to the Rutaceae, an order which Jussieu feems but imperfectly to have studied. He indeed, like Linnaeus, hints some relation between Oxalis and Tribulus or Zygophyllum, both which left hefixons in the first fection of his Rutaceae; but we presume to think they are there misplaced, and that Oxalis is not so much allied to them as to the real Rutaceae, so many of which are found in New Holland. In all such doubtful cases however, which form the difficulty and the pedantry of the study of natural orders, and in which our chief guide being conchylice, humidity and candour are most becoming, we merely aim at collecting observations. The unnatural combinations complained of in a fytem professedly artificial, cannot be half so hurtful as error marked in authority in the details of a pretend-ed natural one. The doubts and hints of the excellent Jussieu are in themselves instructive, but how few are content like him to confess their doubts! He has at length acquired a pupil worthy of himself in this country, Mr. R. Brown, whose opportunities of observation, among the paradoxical novelties of New Holland, have given ample scope to his intelligence and affability.

GERANIA, in Ancient Geography, a town of Thrace.——Alfo, a town of Phrygia.——Alfo, an ancient town of the Peloponnesus, in Laconia, on the confines of Melitenia.——Alfo, a mountain of Greece, in the territory of Megaris, towards the illims of the Peloponnesus.

GERANIS, or Geranium, in Surgery, a bandage formerly applied to fractured collar-bones, and dislocated shoulders. The word is derived from ρέγανη, a crane, because the shape of the bandage was thought to resemble an extended crane.

GERANITES, γερανος, a crane, in Natural History, a name given by some authors to such pieces of agate, or any other of the femail-pellucid gems, as have round spots in them, resembling in colour the eye of a crane.


Gen. Ch. Col. Perianth inferior, of five ovate, acute, concave, permanent leaves. Cor. regular, of five large, obovate or obcordate, equal, spreading petals. Nectary five glands at the base of the germin, alternate with the petals. Stam. Filaments 10, awl-shaped, recurved, united at the base into a small cup, five alternate ones longest, all shorter than the petals; anthers oblong, veratlic, five of them occasionally abortive. Pil. Germin superior, with five furrows, beaked; style central, awl-shaped, longer than the stamens; permanent; stigmas five, oblong, reflexed. Peric. Capsules five, aggregate, membranous, globose, lateral, separating at their minde, each attached upwards to a long, linear, flat, pointed, rigid, smooth awn, at length ephiathically recurved, adhering by its point to the summit of the style. Seeds solitary, lateral, roundish, their surface smooth or dotted.


Obf. This genus, as above defined, contains only the Gerania columna of Linneus, or what are commonly called European Geranioms, or Crane's-bills, bearing but one or two flowers on a stalk. (See Erodium.) Thus it is adopted by Willdenow, who has 39 species, 13 of which are natives of Britain. They are tolerably naturally distributed into three sections.

* Flower-stalks single-flowered; 4 species.

G. sanguineum, Engl. Bot. t. 272, a handflake inhabitant of rocky woods and abrupt gravelly ground, is an example of this section, though the late Mr. Davall once found in Switzerland an occasionally two-flowered variety. See Fl. Brit. 759. A variety found on the Lancashire coasts, of humble depressed growth, with white red-veined petals, is frequent in gardens.

G. fivirium, Jacq. Hort. Vind. v. t. 19, an inconspicuous species, is, we believe, contantly single-flowered.

** Flower-stalks two-flowered. Root perennial, 24 species. Most of the Crane's-bills usually cultivated for ornament are of this division, as

G. amoenifolium of L'Héritier. Curt. Mag. t. 266. This flowery species, discovered by Mr. Maffon in Madeira, was, as Mr. Curtis records, long known in our gardens by the name levigatum, admirably expressive of its smoothness, and the French botanist changed it for the worfe. We could have...
GER

no redress, as the original name had not been printed. It is a hardy greenhouse plant, throwing out, from its short knotty stam., a profusion of spreading, long-stalked, thinning, palmate, primitively leafy, and many spreading, leafy branches, forked upwards. The flowers are large, of a fine crimson, broader than a half-crowned.

G. macrophyllum, Linn. Sp. Pl. 953. Jacq. Rar. t. 134; native of Italy, is a very common hardy perennial in our gardens, remarkable for the roundness of its red petals, and the strong, but aromatic, cedar-like, scent of its herbage. The plant is of humble growth, with a short knotty stem, like the last. Locates soft and downy.

G. phaeum, Linn. Sp. Pl. 953. Engl. Bot. t. 322; and G. suffumum, Linn. Mant. 97; two species very nearly akin, are remarkable for the dark brown colour of their flowers; as G. reflexum, ibid. 257. Cavan. Diff. St. f. 1, is for its reflexed petals, and G. phaeum, L'Hert. Geran. t. 39, first well determined by Haller at his No. 935, though he was not for some time attended to, for its flat, round, ferrated petals, of a pale livid dove-colour. These four last are often seen in gardens about London.

G. nodosum, Linn. Sp. Pl. 953. Engl. Bot. t. 909, is the most rare British species, and scarcely found elsewhere but on the mountains of Provence and Dauphiny, in flaky places.

G. floriatum, Linn. Sp. Pl. 953. Curt. Mag. t. 55, a native of Italy, very hardy with us, is generally admired for its delicately pencilled blossoms.

G. austriacum, Curt. Mag. t. 203, now frequent in gardens about London, but from what country imported is not known, was first ascertained as a distinct species by the late Mr. Curtis. Its flowers are prettily veined with reddish purple on a pale ground.

G. pratensis, Linn. Sp. Pl. 954. Engl. Bot. t. 404, a very handsome blue-flowered species, common in purlines in the north, is extremely remarkable, and almost singular in this natural order, for having sometimes double flowers, in which flat it was found near Athol house, Scotland, by Lady Charlotte Murray in 1793. It is often seen with white petals.

G. argentatum, Linn. Sp. Pl. 954. Curt. Mag. t. 504, a native of Mount Balbus, was introduced into England by the indefatigable and intelligent Mr. Lod lugs, whole zeal and liberality as a cultivator are above all praise. Its leaves are beautifully silver, the plant dwarf, but the flowers peculiarly large, bluish-coloured, veined with red.

G. germanicum, Linn. Mant. 97. Sm. Pl. Brit. 735. Engl. Bot. t. 305. Curt. Lond. falc. 3. t. 424, common about London and Edinburgh, has not been well understood, even by Mr. Curtis, who undertook to illustrate it. Linnaeus originally confounded it with molle hereafter mentioned, from which its even capsules, perennial root, and greater magnitude, keep it very distinct.

** Flower-stalks two-flowered. Root annual; 11 species.

G. bokheianum, Linn. Sp. Pl. 955; placed first in this section, well drawn in Dillenius's Hort. Eth. t. 153. f. 165, is remarkable for its very black hairy feed-veffels, and vivid herbage.

G. molle, Engl. Bot. t. 778, ought to follow immediately; with dictum, t. 753; rapidulphiun, t. 157; and pyllium, t. 585. These four, long confounded, and scarcely understood by any botanist, are beautifully distinguished, in every degree of luxuriance, by their capsides, which are corrugated and twisted in the form, more slightly corrugated, but hairy, with reticulated seeds, in the second, curtained, even and hairy, with reticulated seeds in the third, with much more entire leaves; even and hairy, with smooth seeds, in the half, whose hairs in the part in question are, moreover, close-pressed, not spreading as in the preceding. We were obliged to the late Mr. Davall for first calling our attention to this part, and thus leading to one of the most satisfactory discoveries in European botany.

G. carolinianum, Linn. Sp. Pl. 956. Jacq. Hort. Schonbr. v. t. t. 140, where it is mistaken for a new plant, and called hanginum; follows these; with caldonius, Engl. Bot. t. 259. To which should succeed lucidum, t. 753; then, if it be a distinct species, which we much doubt, purpureum of Willdenow, n. 39, and Villars Dauph. t. 425; and finally rebitum, Engl. Bot. t. 1436. Curt. Lond. falc. t. t. 52. This purpureum has been a weed in Chelsea garden ever since the time of Miller, but though Ray mentions it as a native, see Pl. Brit. 732. G. rebitum, we never gathered it elsewhere.

GERANUM, in Gardening, comprehends plants of the herbaceous perennial kind, of which the species cultivated are, the dark flowered crane's-bill (G. phaeum); the knotty crane's-bill (G. nodosum); the streaked crane's-bill (G. ariatum); the Siberian crane's-bill (G. fibricum); the bloody crane's-bill (G. fanginum); and the long-rooted crane's-bill (G. macrophyllum); but there are other sorts that may be cultivated with propriety.

The fifth species has several varieties, as with short spreading limbs and small leaves and flowers; with large leaves deeply divided, and with variegated or striped flowers.

Method of Culture.—Each of these species of plants is capable of being increased in two ways, either by sowing the seeds or cutting the roots. Where the first method is adopted, the seeds should be sown in the autumn as soon as they have become perfectly ripened, either in pots or in a flaky border in the garden ground where the mould is light and fine. As soon as the plants have acquired a few inches in growth, they should be pricked out into other pots, or beds of fine light earth, at the distance of five or six inches in the latter case; but where this cannot be done, they may be permitted to remain until the following autumn or spring, and be then put out into other pots or borders, where they are to continue, being occasionally watered in a moderate manner.

In cases where the natural roots is practised, care should be taken not to divide them too much; planting them out in the early part of the autumn, either in pots or where they are to continue.

Most of these sorts of plants are of rather hardy growth, and succeed in most kinds of ground, demanding but little attention in their cultivation, beside that of which they are kept clear from all sorts of weeds and rubbish.

All of them are capable of affording variety in the borders, clumps, and other parts of pleasure gardens, and the potted kinds produce a fine effect in situations about the house in mixture with those of other sorts.

GERANOS, Phænix, in Antiquity, a remarkable dance performed in the festival called Delta.

GERANZAGO, in Geography, a town of Italy; nine miles E.N.E. of Pavia.

GERAR, or Gerasar, or Gezarah, in Scripture Geography, a city of the Philistines, S. of Judah. The Philistines were kings of this city in the time of Abraham and Isaac. At this time it was the boundary of the Canaanites, situated on the river Bezer, about seven miles S.W. of Debar, and fixed East of the Jordan. It afterwards belonged to the tribe of Simeon. Gerar extended far into Arabia Petraea, being 25 miles from Elnu, or Petrae, beyond Doroma, the south of Gudah. Mof's says, that it lay between Kadesh and Shur, and he mentions the brook or valley of Gerar. (Gen. xxvi. 26.) Suzon speaks of a little town, called Gera, 50 furlongs from Pelusium.

Gerar
Gerard is confounded with Beerheba, Anthelion, Allulph, and Arad.

GERARD, Herb. in Botany. See ANTHELION.

GERARD, in Biography. See ANTHELION.

Gerard, a native of the island of Martignies, on the coast of Provence. While Jerusalem was the seat of the Saracens, some Nepauaens merchants obtained permission from the sultan of Egypt and Syria, in the year 1250, to erect a Benedictine monastery, near the holy sepulchre, for the convenience of the pilgrims who came to visit it. Among others Gerard came to pay his devotions at the holy city, where he obtained a high character for piety and prudence. The monastery soon became rich, and in conformity with the spirit of the times the abbots built, with the wealth poured in by the rich devotees, an hospice for the reception of the poorer classes, and with proper accommodation for the aged and the sick. The management of this he gave to Gerard. A part of the building was appropriated for a chapel dedicated to St. John, in which the learned and military character should be blended. He began, about the year 1200, to carry his design into execution, when numbers of perfons associated with him under the denomination of the "Hospitales of St. John of Jerusalem," who, besides the three usual vows of chastity, poverty, and obedience, took a particular vow to devote themselves to the relief of all Christians in distress. The order was recognized, and privileges granted to it by pope Paeel II. Gerard was the first grand-master, and such was the commencement of that order which has been so frequently and so long celebrated in history: the members of it were first denominated knights of Rhodes, and afterwards knights of Malta.

GERARD, John, a learned German Lutheran divine, was born at Jena in the year 1621, where he was educated, but at the age of nineteen he went to Altdorf for the sake of greater progress in the oriental languages, and in 1643 the university conferred on him the degree of M.A. He was appointed professor of philosophy at Wittenberg in 1646, and in 1652 he was nominated professor of history at Jena. After this he was created doctor of divinity, and made professor in that faculty, having devoted much of his time to biblical and theological learning. He was likewise appointed rector of the university of Jena. He died in the year 1688, and left behind him, as memorials of his great learning, many works of very deep erudition: among these were: "Harmonia Linguarum Orientalium;" "Disputationum theologicae Practicae;" "De Ecclesiae Copticae Ortu, Progreflis, et Doctrina."

GERARD, Alexander, was born at Garisch, in the county of Aberdeen, in the year 1728; he was educated at the grammar-school at Aberdeen, and so great was his progress, that he was entered a student in Marischal college when he was but twelve years of age. Here he devoted his first four years to the study of Greek, Latin, the mathematics, and philosophy, and was, at the close of the course, admitted to the degree of M.A. He now commenced his theological studies, which he prosecuted at the universities of Aberdeen and Edinburgh. Immediately, on the completion of his twentieth year, he was licenced to preach in the church of Scotland, and in the year 1750 was chosen aitent to Mr. David Fordyce, professor of philosophy in the Marischal college at Aberdeen, and in two years afterwards, upon the death of the professor, Gerard was appointed to succeed him. Here, after a short time, the department assigned to Mr. Gerard was confined to moral philosophy and logic, the duties of which he discharged with conscientious and un Wearied diligence, and with equal success and reputation. He was a member of a literary society at Aberdeen, which met very regularly every fortnight during the winter, when the members communicated their sentiments with the utmost freedom, and received mutual improvement from their literary discussions. In 1759 Mr. Gerard was ordained minister of the church of Scotland, and in the following year he was appointed professor of divinity in the Marischal college, and about the same period he took his degree of doctor of divinity. He continued to perform the several duties attached to his offices till 1771, when he resigned the professorship, together with the church living, and was preferred to the theological chair in the university of King's college, a situation which he held till his death in 1795. Dr. Gerard's attainments were so great that it is not possible to enumerate all his disquisitions of his services, for which a learned and diligent discharge of his ministerial duties: his sermons were simple and plain, adapted to the common classes of hearers, but so accurate as to secure the approbation of the ablest judges. As a professor of divinity, his great aim was not to impose by his authority upon his pupils any favourite system of opinions; but to impress them with a sense of the importance of the ministerial office; to teach them the proper manner of discharging all its duties; and to enable them, by the knowledge of the scriptures, to form a just and impartial judgment on controverted subjects. Possessing large stores of theological knowledge, he was judicious in selecting his subjects, happy and successful in his manner of communicating instruction. He had the merit of introducing a new, and in many respects a better, plan of theological education, than those on which it had formerly been conducted. Having a constant regard to whatever was really useful, rather than to endless speculations, he enjoyed no duty which he was unwilling to exemplify in his own conduct. In domestic life he was amiable and exemplary; in his friendships steady and disinterested, and in his intercourse with society hospitable, benevolent, and unassuming; uniting to the decorum of the Christian pastor, the good breeding of a gentleman, and the cheerfulness, affability, and ease of an agreeable companion.

GERARD, John, a surgeon and famous herbalist of the time of Queen Elizabeth, was born at Nantwich, Cheshire, in 1545. He practised surgery in London, and rose to eminence in that profession. Mr. Granger says he was many years retained as chief gardener to Lord Burleigh, who was himself a great lover of plants, and had the best collection...

Gen. Ch. Cal. Perianth inferior, of one leaf, permanent, with five upright, sharp segments. Cor. of one petal, ringent, tube round, longer than the calyx; upper lip erebus, obtuse, flat, broadened, emarginate; lower reflexed, deeply three-cleft, its lateral segments emarginate, the middle one shorter, deeply divided. Stam. Filaments four, scarcely so long as the tube, two of them rather shorter than the rest; anthers small. Pfl. Germin superior, ovate, small; style simple, short; stigma obtuse. Peric. Capsule ovate, of two cells and two valves, opening at the base, the partition contrary to the valves. Seeds ovate; according to Linnæus solitary, which does not appear from Plummer's works.

Eff. Ch. Calyx five-cleft. Corolla two-lipped; the lower lip in three deep emarginate lobes, the middled smallest deeply divided. Capsule of two cells, opening at the base.

This
This genus, as founded by Plummer and adopted by Linnaeus, entirely depends on the first species.

1. G. tuberosa. Linnae. Sp. Pl. 848. (G. humilis, bugula folia, aphiodi radice; Plum. Ec. 64. t. 75. f. 2.) found by Plummer in South America, and never seen by Linnaeus. We have a very bad specimen from that country, which agrees with Plummer's figure, as to the leaves and habit, but nothing can be made out of the fructification. The above characters are taken from Plummer's works. Willdenow, by mistake, we presume, fixes the capite of is cells. Dr. Swartz appears not to have found this, or any other Lapso of Gerardia, in the West Indies. Linnaeus, well aware that the various plants he subsequently referred to this might probably not well accord with the above, has given a hint that "the fructification requires examination." Whatever might be the result of such examination, this plant must be the true, though it were the only Gerardia, and the rest in that cafe must have a new generic appellation and character.

2. G. dolynsifolia. Linnae. Sp. Pl. 846. Roxb. Coronam. v. 1. t. 42. is totally distint in habit and character. Its authors have a remarkable cres, indicated but misplaced in Roxburgh's figure, for what there appears the anther is the crest, and the apparent point of the filament is the true anther, at least in our specimen.

3. G. purpurea. A North American species, closely agreeing with the last in habit, but has no such crest or appendage; but their flowers are otherwise very similar. G. flava and polkalearia are undoubtedly of the same genus with this; but glatimina, figured in Lamarck's t. 529. f. 1, has a very different appearance. It was gathered in China by Osbeck, who likewise has given a plate of this species in his Travels, t. 9. Lamarck's f. 2 is G. polkalearia.

Willdenow has 12 species in all. None of them seem now to be known in the English gardens, though highly differing of culture for the beauty and size of their flowers. G. purpurea indeed is mentioned in the Hortus Kewensis, as a hardy annual, introduced in 1772, by Samuel Martin, M. D., but it probably did not long remain, or at least has not been dispersed among collectors in general.

GERARDMER, in Geography, a town of France, in the department of the Vosges, and chief place of a canton, in the district of St. Die, 10 miles E. of Remiremont. The place contains 4,285, and the canton 4,285 inhabitants, on a territory of 1224. kilometres, in one commune.

GERARDS, Mark, in Geography, a painter, born at Bruges in 1501, who came to England not long after the year 1506, and remained till his death in 1645. He was made painter to queen Elizabeth, as he was also to Anne of Denmark. His works are very numerous here, though, as he used no mark, they are not easily known. He painted very thin and neat; ornamenting the dresses of his figures with jewels and pearls in a, profile manner. The sitters he generally painted of a greyish taint, and these are the best tokens of his hands by which his pictures may be discovered.

He painted a procession of queen Elizabeth to Hunford house, which is engraved by Vertue; and he drew the queen and the knights of the garter in procession; from which design Ainsloe's print is engraved in his history of that order. He also wrote an introduction to the art of drawing, which was translated and published in English in 1677.

GERARDSTOWN, in Geography, a small town of America, in Berkeley county, Virginia, containing about 30 or 40 houses; 10 miles from Martinsburg.

GERASA, or Gerisa, in Scripture Geography, a city beyond and east of the Dead sea, included by some in Cellephoria, by others in Arabia; placed among the cities of the Decapolis, Matt. vii. 28. The Greek editions of Matthew, for Gereophenes, read Gerefenes, and some, Gadarens. Luke and Mark have the same reading. Origen thinks that the true reading is neither Gera nor Gadara; but that the city of Gergesa is meant, which lies on the lake of Tiberias, where, in his time, the people shewed the rocks and precipices from which the swine ran down. It is also called Gira and Girgeles, and was one of the cities that belonged to the half-tribe of Manasseh.

GERAS, ORF, in Geography, a town of Austria; 7 miles E. of Korn Neuburg.

GERAU, a small country of Germany, situated near the confluence of the Maine and the Rhine, in the circle of the Upper Rhine: its capital is Darmstadt.

GERAL, Grofa, a town of Germany, in the principality of Hesse-Darmstadt; 8 miles W. N. W. of Darmstadt.

GERBA, or Jerba, a small island in the Mediterranean, near the coast of Tripoli. Its principal product is barley and fruit. Its ancient name was "Lotophagitis." N. lat. 33° 56'. E. long. 14° 20'.

GERBEL, NICHOLAS, in Biography, a native of Pfortzheim, was known and highly celebrated in the fifteenth century as a most learned jurist. He was professor of the law at Vienna, and afterwards at Strasbourg. He attained like- wise to a high reputation for his knowledge in history and antiquities. He is characterized by De Thou as one equally estimable for his erudition and humanity. His works are "Itinera in Tabulam Graeciae Nicolai Sophiani;" "De Anabaptistarum ortu et progressu;" "Vita Joannis Capciniani." This first of these was published in 1545, and afterwards augmented into seven books, comprehending a complete description of all Greece, and printed at Basl in 1550. Gerbel corrected Capcinian's "Chronicle of the Cawars," and Arrian's "Hift. of Alexander."" GERBERA, in Botany. See ARNICA.

GERBERAY, in Geography, a town of France, in the department of the Oise, fortified in the 9th century, to fill the incursion of the Normans; 12 miles N. W. of Beauvais. N. lat. 49° 32'. E. long. 1° 57'.

GERBERT, or GIBERT, Pope, in Biography, was a native of Auvergne, and born of obscure parents in the neighbourhod of Aurillac, where he was a monk; and may be justly considered as one of the principal ornaments of the tenth century. His talents were so various, and his affinity in acquiring knowledge so great, that it is difficult to say what were those branches of literature and science in which he chiefly excelled. He was a divine, a mathematician, and a philosopher, and he wrote upon geometry, particularly the quadrature of the circle, astronomy, logic and rhetoric. He was eminently distinguished by his knowledge of music, on which he composed, in Latin monikih rhyme, a didactic poem, entitled "Ars Musica," preferred in the Rawlinson collection of MSS. at Oxford; and in this little work is a separate treatise, under the title of "Rythmomachia," or the battle of numbers or figures, which Gerbert composed as a kind of game, soon after the arrival of the Arabian figures or cyphers in Europe, for which the author gives rules refembling those for chefs. Having cultivated music very assiduously, regarding it as the second in rank, among the liberal arts, he must have acquired a considerable reputation in it, as the authors of the twelfth century gave him the title of Gerbert the Musician." He is said to have been as well skilled in the construction of musical instruments as in the use of them, particularly the hydraulic organ. William
of Malmsbury speaks with wonder of the perfection to
which he had brought this instrument by means of blowing
it with warm water. His extraordinary talents and attain-
ments established his claim on those high ecclesiastical pre-
ferments to which he was advanced. Before his exaltation
to the papal chair as the successor of Gregory V., in the
year 999, he was, first, archbishop of Rheims, and afterwards
of Ravenna. As pope, he assumed the name of Silvester II; but he died in 1003, having filled the papal throne
four years. The day of his death is marked in his epitaph,
which was written by pope Sergius IV., who succeeded
him in 1003, and is still to be seen in the Lateran church.
This pope contributed very much to the reformation of
letters in Europe. His genius, says Motheim, (E.H. vol. ii.)
was extensive and sublime, embracing all the different
branches of literature; but its more particular bent was
towards mathematical studies. Mechanics, geometry, al-
chemy, arithmetic, and every kind of knowledge that had
the least affinity to these important sciences, were cultivated
by Gerbert with the most ardent zeal, as his various writings
testify; and he had the merit of employing every method
that was proper to animate others in the culture of the liberal
arts and sciences. The effects of this noble zeal were visible
in Germany, France, and Italy, both in the tenth and fol-
lowing century. Gerbert was, in a great measure, indebted
for his extraordinary acquirements, more especially in physics,
mathematics and philosophy, to the writings and instruc-
tions of the Arabians, who were settled in Spain. It was in
this century that the plan of the holy war was formed; and
through the conclusion of it, the bloody signal was given by
our learned pontiff, in the first year of his pontificate. This
signal was an epistle, written in the name of the church of
Jerusalem, to the church universal throughout the world, in
which the European powers are solemnly exhorted and in-
terceded its succours and deliver the Christians in Palestine.
The pontiff’s exhortations, however, were only regarded by
the inhabitants of Pisa. We shall here add that Gerbert’s great
learning induced the vulgar to suspect that he was addicted
to magic, and Platina has adopted this absurd notion; for he
says that he obtained the papacy by ill arts, and that he left
his monastery to follow the devil. He allows him, indeed,
the merit of a sincere repentance; but mentions some pro-
digies at his death, which will claim little regard on the testi-
mony of such a writer. The most complete collection of
Gerbert’s letters is that of Duchesne.

GERBERT, Fader Martin, a German musical writer, who
belonged to the congregation of Benedictines, at the abbey
of St. Blaise, in the Black Forest, near Friburg, in Durlb,
about 50 miles from Strasbourg, and has been elevated
to the head of his society under the denomination of “Prince-
Abbot” of St. Blaise. In 1754, he learned abbots published
the plan of a “History of Church Music,” from the first
century to the present time, under the title of “De Cantu
et Musica Ecclesiastica à prima ecclesiae Ætate, usque ad praecipsum tempus.” After this publication he travelled through
Germany, and a great part of France and Italy, in order to
collect materials in the several convents and public libraries
of those countries, and in 1765 he published his “Itinerary,”
informing the public of the success of his researches. A great
part of the author’s materials for the history of sacred music were unfortunately destroyed by fire; but availing
himself of his remaining flock, he refixed the work.

Though the indefatigable and pious abbot was in search of the music used in the Roman masses and liturgy, he cau-
didly mentions the music of the Protestant churches. He
had procured from England Dr. Boyce’s magnificent publica-
tion of our cathedral music from the time of the reforma-
tion till the middle of the last century, and allows the com-
position to be excellent; but wishes for more plains and
simplicity in favour of the words; and thinks that fugues
and learned counterpoint, though ingenious productions,
render the words unintelligible. The author has intimated
at the end of the second vol. the whole mass, “In cetera Domini,”
in eight parts, in score, to be sung antiphonally as in our
choirs, from side to side.

The harmony is very pure; but we have been so long ac-
quainted to more varied, express, and elaborate composi-
tions in our cathedral service, that such music would be thought very timid and uninteresting, if adopted in our
choirs. After this, the “Gloria in excelsis” is given
in the same simple counterpoint; where nothing is varied.
These two choirs are accompanied by two organs on a ground.
Then the gradual, the credo, the offertorium, the sanctus, and
the benedictus, all in plain counterpoint.

The communion service is in figurative harmony, but very
dry, ancient, and common.

The plates given of the primitive notation of the chants
and hymns, before the invention of lines and spaces, or a
time-table; and indeed, even before counterpoint was
attempted, in dots over the words are innumerable, from the
Lexicon Diplomaticum of Walther, and from ancient
milliafs. But these ever remain more curious than useful.
For to acquire a clear conception of their import would lead
to no useful or amusing knowledge; as the chant or plain-
fong is generally rude, uncouth, and unmeaning, that it
would furnish a very inadequate reward for the labour of
deciphering it.

GERBEVILLER, in Geography, a town of France, in
the department of the Meurthe, and chief place of a canton,
in the district of Luneville; 5 miles S. of Luneville. The
place contains 2,070, and the canton, 9,169 inhabitants; on
a territory of 324 square kilometres, in 23 communes.

GERBER, Sir Balthazar, in Biography, a painter in
miniature, born at Antwerp in 1592. He was employed
by Charles I. but is far more conspicuous as having
been engaged, in conjunction with Rubens, to negotiate a
treaty with Spain; and for having been for a time British re-
sident at Brussels. His being in the suite of Buckingham
in Spain was the means of this elevation; for which he does
not appear to have been duly qualified. He was somewhat
acquainted with architecture, and was employed by lord
Craven to give designs for Hempsted-hall, which has since
been burnt.

Being neglected by the court, he, in 1648, appears as an
author, and founder of an academy at Bethlem Green; and,
in 1649, published his first lecture on geography. He af-
terwards went to Cayenne, and settled with his family at
Surtain; where, by order of the Dutch, he was fished and
sent back to Holland, from the jealousy of that govern-
ment, which regarded him since his naturalization in England
as an agent of the king. On the restoration of Charles II.
he returned to England, and prepared triumphal arches for
his honour. Here he practised various kinds of living for
several years, with no great respect or profit, and at last died in 1667, having passed his latter days in all the expeditions
of quackery.

GERBILLO, John Francis, a distinguished Jesuit
missionary, was born at Verdun in 1654. He entered into
the Society of Jesus when he was fourteen years of age,
and having constantly the million to China in view, he qualified
himself for it by the study of the mathematics, and those
sciences that might be most useful to him in his great work.
He had the good fortune to see his wishes accomplished in
1685, when he was allowed to embark for China, in com-

party with six other persons, members of the same society. On his arrival he remained at Pekin, studying the language, and during this period, being admitted frequently into the presence of the emperor, he so ingratiated himself with him, as to obtain an appointment to join an embassy sent to regulate the boundaries with the court of Muscovy. He contributed much to the succees of this business, and on his return to China was treated with great honour by the emperor, who chose him his instructor in mathematics and philosophy. Gerillon is supposed to have enjoyed more advantages than almost any other person, for studying the manners of the Chinese court, and for making observations on the neighbouring country. He obtained permission to preach the Christian religion in China, and had the direction of the French college in Pekin, and was in the end made superior of all the missionaries sent from France. He died at Pekin in the year 1707, leaving behind him curious accounts of his eight journeys into Tartary, which have been printed in Duc Halle's Description de la Chine. He was the author of the "Elements of Geometry," and of a work on Perspective, both printed in a very handsome manner at Pekin.

GERBOA, in Zoology. See Dirus.

GERBSTADT, in Geography, a town of Germany; in the county of Mansfeld; 30 miles S.W. of Dessau. N. lat. 51° 40'. E. long. 11° 47'.

GERDAU, a river of Lueneberg, which runs into the Ilmenau, at Oldenstadt.

GERDAVEN, a town of Prussia, in the province of Westphalia, situated on the Omet, near a considerable lake, which is called the "Calendar of Gerda ven," from its prophesying the weather; 30 miles S.E. of Konigberg. N. lat. 54° 16'. E. long. 21° 27'.

GERDEN, a town of Germany, in the bishopric of Paderborn; 16 miles E. of Paderborn.

GERDES, DANIEL, in Biography, was born at Bremen in 1698, where his father was engaged in a commercial life. Great care was taken of the education of Daniel, who made rapid progress in the classics. At first it was intended he should pursue the law as a profession, but the plan was changed, and he devoted himself to the study of theology. In 1722 he was admitted into holy orders, and immediately afterwards made a tour on the continent, and formed an acquaintance with the most learned men of that period. In 1726 he was admitted to the degree of doctor, and in 1735 he was chosen professor of theology at Groningen, and upon his entrance on the office he delivered an oration "De mutations que Fideles omnia docet." The same year he was elected a member of the royal academy of sciences at Berlin. He died in the year 1765, leaving behind him many works that bear ample testimony to his learning and zeal in the cause of literature. His writings are mostly theological, and tend to the elucidation of the difficult parts of the Old and New Testament. Gen. Bioq.

GERDIK, in Geography, a town of Russia, in the government of Perm, situated on the Volga; 152 miles N. of Perm. N. lat. 59° 40'. E. long. 56° 13'.

GERDOBA, a mountain of Africa; 80 miles E. of Angola.

GEREELK, a town of Hindoostan, in Bahar; 12 miles S. of Bahar.

GEREM, a town of Grand Ducharie; 15 miles S.S.W. of Badakhan.

GEREMSHANGEAIA, a town of Russia, in the government of Upha; 36 miles W.N.W. of Bagulma.

GEREN, a town of Prussia, in Pommerania, on the Vistula; 9 miles W.S.W. of Marienburg.

GERENI, or GERESTI, in Ancient Geography, a town of Italy. - Also, a town of the Peloponnesus, in Laconia, Prokon - y; also, a town of Megglen, on an eminence, S.W. of Alba - gonia. Paunian says that this town was the fame with the "Regio" of Homer. It was consecrated to Mars, an ingenious physician, slain by Eryphantes, whole bones were collected by Neller, and deposited at Rhodon, near this town. It had a temple dedicated to Mars. East of it was a mountain called "Calathous," on which was a temple consecrated to Calathus, with a grotto, having a strait entrance, and containing in its interior many curiosities.

GERENNA, or GERENA, in Geography, a town of Spain, in the province of Seville, surrounded by large stones, supposed to have been the effect of an earthquake; 12 miles N.W. of Seville.

GERENSKOAI, a fortres of Russian Siberia, in the government of Kolomna; 240 miles S.W. of Kolom - na. N. lat. 52° 53'. E. long. 59° 14'.

GERESHEIM, a town of the duchy of Berg; 5 miles E. of Duffeldorlo.

GEREK, in Myth, one of the clefs.

GERESPA, in Ancient Geography, a town of Asia, in the interior of Media, sometimes called Gerusa, and Ger - sa.

GERESTADT, in Geography, a town of Norway, in the bishopric of Agderhus; 32 miles S.W. of Tonberg.

GERESTO, a town of the island of Negropont; 15 miles S. of Carnito.

GEREUTH, a town of the principality of Wurzburg; 5 miles N. of Bern.

GERFALCON, GYRFALCON, or JERFALCON, (see Falcon). This is naturally a very bold, wild and fierce bird, and is therefore very difficult to be restrained; but when that is done it proves one of the very best kinds, and will fly at almost anything. The beak of the geyralcon is always blue, and the claws are remarkably long and strong.

In going up to the gate, the sportmen exports it, these birds do not hold the same fort of courage that others do, but immediately climb up upon the train on sight of the bird, and as soon as they have reached her, they immediately make the attack, and generally pull her down at the first encounter; but if not, always at the second or third.

This sort of hawk is to be fed and rewarded like the others. It is of a very fly and crafty nature, and is so slyish, that it loves to keep the calling a long time; therefore, Instead of cotton, it is proper to give them sometimes a calling of tow, and to keep them sharp. As to the reclaiming, this sort of hawk, it is only to be done by gentlemens and kindred; and when she has been taught to be turned loose, she is not to be taught to come to the pelts of hens or other fowl. But the muff never be suffered to taste any living flesh, for that will be apt to draw away her love from the hand and voice. Whenever the cats, the falconer must be close to her, and must make her eat the choicest pieces out of his hand. There is great care to be taken in the making of these birds, for as they are made at first, so they are for ever; and it is a necessary caution, with birds of this bold and fierce nature, not to curry over the business, but to repeat the same thing very often till it is perfectly fixed. See Falconry.

GERGAR, in Geography, a town of Spain, in the province of Grenada; 10 miles S.W. of Purchena.

GEREFALVA, a town of Transylvania; 16 miles W. of N. W. of Hermelstadi.

GEROCAS, See GERASA.
GER

GERGeszetes, or Gerghashites, in Ancient Geography, an ancient people, who inhabited the land of Canaan, before the Israelites took possession of it. Their territory lay next above that of the Amorites, on the east side of the sea of Tiberias; and it was afterwards possessed by the half-tribe of Manasseh. See Geresa.

Gergetha, or Gergesa, a town situated in the Tragade, E. of Rhethum, Ophrynnion, and Dardanus, in the vicinity of the site of Troy or Ilissus, near mount Ida. This town appears to have been inland from some distance from the sea.

Gergina, a town of Asia, in Phrygia, at the foot of mount Ida; being the same with Gergetha.

Gergis, the name given by Steph. Byz. to the Gergash of Strabo.

Gerets, in Geography, a town of Africa; 80 miles W. of Tripoli.

Gerovia, in Ancient Geography, a strongly fortified place of Gaul, belonging to the Arverni. According to Cesar (L. viii. 36), it was five miles in circumference, and every access to it was extremely difficult. At length it was obliged to submit to the victorious arms of Rome, and it was probably so completely destroyed, that no trace remains from which we may ascertain its situation. It has been conjectured, however, that its situation was in the vicinity of Clermont.

Gerhardston, in Geography, a town of Germany, in the principality of Anspach; 28 miles W. of Anspach. N. lat. 49°. 17'. E. long. 10°. — Alto, a town of Wurttemberg; 28 miles E. of Hallbrun.

Gerines, a sea-port of the island of Cyprus, anciently called “Ceriny.” The walls, which are about half a mile in circumference, appear to be erected on the foundation of the ancient walls. This place has one entire church, and two or three in ruins. Its chief trade is with Carmania, whither it exports rice and coffee brought from Egypt, and whence it brings back flax and a great number of packages. Gerines is the residence of an Aga and Cadi: 16 miles N.N.W. of Nicophorion.

Geringswald, a town of Saxony, in the circle of Leipzig; 20 miles S. E. of Leipzig. N. lat. 51°. 5'. E. long. 12°. 46'.

Geris, a town of Egypt, on the left bank of the Nile; 8 miles N. of Abydus.

Gerisa, in Ancient Geography, a town of Africa Proper, situated between the two Syrtides. Ptolemy.

Gerisau. See Gerisa.

Gerikow, Jorkow, or Barah, a town of Bohemia, in the circle of Saatz; 32 miles N. E. of Saatz.

Gerlach, Stephen, in Biography, was born at a village in Swabia in the year 1546. He laid the foundation of a learned education at Stuttgart, and became famous for his diligence at Tubingen, where, in 1566, he took his degree of B. A. with great applause. Shortly after this he withdrew from the university on account of the plague. He was admitted to the degree of doctor in philosophy in 1567 at Ellingen, and in 1573 he accompanied an embassy from the emperor Maximilian II. to the Turkish court. He continued at Constantinople about five years, acquainting himself with the manners and religion of the Turks and Greeks, and cultivating acquaintance with the most eminent men in the latter communion. Upon his return to Tubingen he obtained other preference, and engaged in the duties of his profussion with so much zeal and industry, as to injure his health. He died in 1612 in the 66th year of his age. He was author of “An Epistome of Ecclesiastical History,” of “A Journal of the embassy sent to the Porte by the emperors Maximilian II. and Rudolph II.” abounding in curious and interesting particulars, historical, ecclesiastical, and theological; and numerous theological "Dissertations," &c. Morei.

Geratzko, in Geography, a fortress of Ruffia, on the E. side of the Irtisich, in the government of Kolyvan; 212 miles W. of Kolyvan. N. lat. 55°. 20'. E. long. 75°. 24'.

Germ, in Vegetable Philosophy. See Embryo.

Germ, in Navigation and Commerce, the name given in Egypt to small vessels which serve to carry European merchandise from Alexandria to Rosetta, and to bring back to Alexandria the commodities of Egypt and Arabia. These vessels are a kind of strong bark, tolerably constructed; without decks, drawing little water; and, according to their size, having two or three mats with very large lateen sails, the yards of which are fixed to the heads of the mats, and cannot be lowered, so that, however bad the weather may be, the sailors are obliged to climb up the whole length of them, in order to furth the sails. They are, in general, of about five or six tons burden. Goods are often damaged in these uncovered vessels, and the navigation of them is dangerous in a rough sea. Although the distance which they have to sail is scarcely more than 12 leagues, and though the bay of Aboukir, which is in the middle of their passage, affords them safe shelter, this coasting trade is not free from danger, especially at the mouth of the western branch of the Nile, formerly called the "Bolbitis," now "the branch of Rosetta," where it is forced by the wind from the offing, and opposed by the stream of the river, breaks with great fury. A small island, dividing the entrance of this branch, leaves on each hand a narrow passage, called the "language of the country" "Boghais," a canal or strait. But there is only a narrow channel of this passage which is securely navigable; for it is continually shifting, on account of the shallowness of the bottom and stightening of the sea. A pilot, "Reis," or master of the "Boghais," incessantly employed in finding this changeable passage, and indicating it to the "germs." Inspite of all these precautions, they often go to shore; and, being foul overcharged with water and sand, perish with their crews and cargoes.

Germa, or Gers. in Ancient Geography, a town or Asia, on the Euphrates; which, according to Ptolemy, was a colony founded by the Gauls, named "Belisboanos," in Galatia.

Germain, Count St., in Biography, a conspicuous person of a mysterious character, who resided in England a considerable time, and of whom nothing was certainly known, but that he was a fine performer on the violin, and an elegant, though not a learned or original, composer. Being here at the same time as Prince Lobkowitz, they were inseparable. He printed a book of violin solos to present to his friends and admirers, which he called, "La Musique RAISONNEE," in which there were elegant pages, singular movements, and amusing "SUCCESSIONS." In his songs, the melody was Italian, and in good taste; but the accompaniments were thin, and without carrying on any ingenious design. It was reported, that when examined before the privy council, during the rebellion, he was obliged to divulge, "feu figlau cellamiones," that he was originally a musician by profession; but that by play, and his "bonnes fortunes," he had realized an independent fortune; but this, like newspaper reports, merits confirmation.

Germain, St. in Geography. See St. Germans.

Germain, St., a town of France, in the department of the Creuse, 15 miles S. W. of Gueret.—Alto, a town of France, in the department of the Aube; three miles S. W. of Troyes.

Alto,
GERMANY.

GERMAN, in Matters of Genealogy, signifies whole, entire, or own.

"Germani, quasi cadem filipe gereri."

Fell. Hence,

GERMAN, Brother, denotes a brother both by the father's and mother's side, in contradistinction to uterine brothers, &c. who are only so by the mother's side.

GERMAN, Cousins, are those in the first or nearest degree, being the children of brothers or sisters.

Among the Romans we have no instance of marriage between cousins german before the time of the emperor Claudius, when they were allowed by the usages of the law.

Theodosius prohibited them under very severe penalties, even fine and proscription. See Consanguinity.

GERMAN accacia, bezant, bible, black, color, compasst, emperor, empire, flute, language, meaures, monies. See the several substantives.

GERMAN School of Engraving. Germany was probably the birth-place, and Italy the cradle, of that art of engraving which is performed with a view to its being afterward printed on paper. Engraving itself, as performed on metals, and with the instrument which is still in use for that purpose, which in the English language is termed a graver, and in French la burin, is of very remote antiquity; the Greeks of the early ages having employed it in the decorations of their shields, pateras, and other implements of war and sacrifice; and the Hebrews, and perhaps the Chaldeans and Egyptians, at a still earlier period; but medals we suppose (which is by no means improbable) that the art of engraving and printing from tablets of wood travelled from China to Europe; it was referred for the artifts of Germany or Italy; and most probably the former, first to perceive that ink might be delivered, and impressions thus multiplied to an indescribable amount, both from the incisors and surfaces, of engraved plates of metal, and blocks of wood.

The precise time of the discovery has not been ascertained. The baron Heinschein, who had excellent opportunities of acquiring information, and pursued his enquiries with zeal and accuracy, has clearly shewn that the fabrication of cards for games of chance was first practised in Germany, by means of the art of engraving, and was in use so early as the year 1576. Not long afterward, the same art that had been sublervient to amusement, was employed to gratify and disseminate superflution, and extremely rude outlines of fants and legendary tales, which were cut on tablets of wood, and were printed in the cities of Mentz, Strafburg, and Haerlem, toward the close of the fourteenth, and beginning of the fifteenth, centuries, are not uncommon in the portfolios and bibliographical collections of the curios.

Of these engravings, the earliest that is known, whose inscription contains a date, and which may therefore be esteemed a great curiosity, is now in the library of Earl Spencer. It was discovered by Hein schem in the library of a convent in Buxheim, near Memmingen; it subject is the legendary tale of St. Christopher carrying the infant Jesus across the sea; it bears the date of 1423, and is intitled "Christo-feri faciens, die quacunque tueris. Illa nempe die morte mala non morieris." This rude but curious engraving is of the folio size, and was found carefully pasted within the cover of an old book, with a view, no doubt, to its preservation.

The same magnificent collection of Earl Spencer contains also one of the original engraved blocks which were used in the very infancy of printing, before movable types were invented. It appears to be of the wood of the pear tree, and in the course of the three centuries and a half since
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It was engraved, is here and there perforated by worms. It may be necessary to observe, that the earliest printed books were imprefled from engraved blocks or tablets of this kind. To the rude representations of saints and miracles, their names and legends, cut in the Gothic character, or German text, on a scroll or label, were added, for the better information of the unlearned spectator, and in aid of the labours of the artist, if such he might be termed; and from these explanatory scrolls, the idea was first caught of printing books, to which the works of imitative art became in their turn merely illustrative. Some of these prints are finely outlined, and in others, which were produced from wood blocks, with shading, with a single course of lines, is feebly attempted. The tablet in the collection of earl Spencer, is of the former kind; and originally constituted the second leaf of the second edition (of which there is a complete copy in his majesty's Library) of the history and visions of St. John the Divine. It is, probably, therefore, one of the earliest engravings on wood that was ever performed, excepting the prototypes for the playing cards, which have been before-mentioned, and perhaps the oldest of which the original tablet itself is still extant. Hence it appears that the art of engraving is the parent of that of printing, and that at least that branch of printing which delivers the ink from the surface of the engraving, and which is now termed letter-press printing, originated in Germany.

The present writer conceives that a great deal too much of spurious importance has been attached to the invention, as it has been termed, of printing that the traffickers in its productions, by diverting the attention of those who might else have become men of taste, from its true mark, have filched or intercepted much of the pleasure which the engravers' art is capable of imparting; and that the philosophy of engraving has buried alive under a heap of rarity and early rubbish, which has been piled, and is still piling, on it without mercy, from the shovels of dealers, collectors, and those who have, unfortunately for society, nothing better to do than to labour under them.

A knowledge of the era, and of the author of a great work, or an useful invention, is certainly desirable. Bedefe that it is necessary to the truth of history, it seems to affict us in indulging the amiable sentiment of gratitude. It would call forth our sincere regret, if the name of the author of Paradise Lost, or the Cartoons, or Principia, had sunk in oblivion. But at the time which we are considering, paper and ink were in constant and daily use; and impressions from dies and from feals had for ages been taken; and were under hourly observation; it therefore required no protracted train of thought; no long connected chain of causes and effects; no mighty genius, like that of Homer, Michael Angelo, or Newton, to perceive that invention its might also be taken either from the surfaces or incisions of engraved blocks or plates. The art of printing, as I conceive, originated in a concurrence of circumstances entirely independent of the minds or studies of its reputed inventors. We have seen that at first, when it was coarsely performed, and (like the tops of ballads, and the dying speeches of criminals at press) grossly addrest itself to the lower classes of the community, it was regarded as of very little consequence; and though Kolker, Guttemburg, and Faul, cannot be ranked in the class of inventors, the inferior merit of perceiving that the arts of engraving and printing might be applied to purposes of greater magnitude and importance; than had hitherto been observed, may be justly claimed for them. It is the important confquences gradually resulting from the discovery, that have made us attach a degree of credit to the name; and entertain an unremitting respect for the supposed researches, of the discoverers, to which, in point of real ingenuity, the maker of the first pair of spectacles or stockings, or the first sheet of paper, would be far more justly entitled.

In tracing effects to their true causes, it ought not to be forgotten that the great benefits we have derived, and continue to derive, from engraving and printing, ought, in fairness, to be partly ascribed to the discovery of the means of converting rags into paper; this probably helped to suggest the idea of printing, and perhaps two centuries and a half had scarcely more than brought this invention to the degree of perfection necessary for the production of impressions from printing types and engravings. Had the modern art of making paper been known to the ancients, we had probably never heard the names of Faul and Finiguerra, for with the same kind of flamps which the Roman tradesmen used for their pottery and packages, books might also have been printed; and the same engraving which adorned the shields and pateras of the remote ages, with the addition of paper, might have spread the rays of Greek and Etruscan intelligence over the world of antiquity. The procaces of printing is indeed so simple in itself, and was so nearly obvious in the flate of things we have just attended to, that a child at play, who wanted to multiply a given form, might almost be ashamed not to have perceived it; and we ought rather to wonder it was not discovered sooner, than that it was discovered so soon.

The art of engraving and printing from tablets of wood, then, may be said to have been rather discovered than invented in Germany, and rather seen than discovered. That it was little thought of at the time, may be inferred from the number of wood cuts; the production of this period, which appear without either dates or the names of their authors, who were at once the designers, engravers, and publishers of their own works, but who deemed those works of too little importance to claim for themselves distinction on account of having performed them.

For the accommodation of those persons who could not afford to purchase manuscript copies of the Old and New Testaments, befide the apocryphal visions of St. John the Divine, which has been already mentioned, a small folio volume, entitled "Hiloriae Veteris et Novi Testamenti," (commonly known by the name of "The Poor Man's Bible," ) was published about this time, or soon after. In the same manner as the former, each leaf printed from a single engraved block of wood, confisted of a mixture of reading with pictorial representation, such as it was; to which colour was in some instances afterwards added with the hair pencil, or some such implement. The printing was performed only on one side the paper, and two of these leaves being pasted together have the appearance of a single leaf printed on both sides. Copies of these early wood cuts, sufficiently faithful, may be seen in Strutt's Biographical Dictionary of Engravers. As the title of this anonymous and undated book (the Poor Man's Bible) imports, its publication was regarded merely as a cheap contrivance for disseminating the knowledge of holy scripture. Other books of engravings, printed in the same manner, were soon afterward produced, among which are "Hiloriae beatae Mariae Virginis," "Ars Memorandi," "Ars Moriendi," and "Speculum Humanae Salvationis;" but we pass over, as of minor importance, all particular mention of these and various other engravings on wood by unknown workmen, which were apparently executed in Germany, about the time now under our observation. The next work which bears a date after the print of St. Christopher and the infant Jesus, and the first engraved book which bears date at all, is called "The Chirography of Doctor Hartleb." It consists of twenty-four small folio leaves, printed on both sides.
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sides. "At the beginning of this curious book," says Strutt, "is a large vignette, representing Dr. Hartkib kneeling and presenting it to the princess Anne, who is seated upon her throne; and the names of these two personages are engraved at the bottom of their portraits. The prints in this book are exceedingly rude; but have not, as far as one can judge from the copy of one of them, given in the "Idee generale d'une Collection complete d'estampes," the appearance of being so ancient as those in the Apocalypse, or Poor Man's Bible. This curious compilation is dated 1458, and the name of Jorg Schafte, the artist, who is supposed to have performed the engravings, appears upon the fourth page."

Of Hans Sporer and Johann von Paderborn, who are mentioned among the earliest German engravers on wood, we know nothing more than their names. They may perhaps be the authors of some of the works we have enumerated.

Johan Schmitz executed the geographical charts for the edition of Ptolemy, printed at Ulm in 1496. His map of the world is ornamented with ten rude heads, which are intended to represent the winds, and is inscribed, "Inculptum eff Johanni Schmitz de Arnheim."

Sandrart indeed mentions and copies a print, which he believes to bear the date of 1455, and which is marked with a cipher, such as the reader will find in our first plate of the monograms, &c. of the German school of engravers. As this cipher is composed of the initials of Hans Sporer, it may possibly be from his graver; yet neither Sandrart, nor the author of "The little chronological Series of Engravers," which was printed at Cambridge, ascribes it to him; the latter allots it in his preface, that the two fires in the date, or what Sandrart supposes to be such, are intended for sevens; which makes a difference of twenty-two years in the age of the print, and brings it down to the time when the elder Schauflein is believed to have flourished.

The subject of the above print is a young woman carding an elderly man while she feeds his furies; a subject which has been often repeated by other masters, both on copper and on wood.

In what part of Germany, Hans or John Schauflein was born does not appear. Strutt says, "his prints are executed in a bold spirited style, and the compositions shew him to have been a man of genius, though the style manner which characterized the early German masters obscures much of their merit. Besides which they are incorrectly drawn; the extremities of the figures, in particular, are very defective. Schauflein usually marks his prints with an H and an S; or an L and an S joined together in various ways. To these he sometimes added a Baker’s peel, which formed a pun upon his name, a peel, in the German language, being called Schaufel, and the word Schauflein signifying a little peel. At other times we find prints of this early period, marked with two little peels crossing each other, which perhaps may mean the two Schaufleins, if they ever worked in conjunction.

The works of the elder Schauflein are chiefly very small, and he is therefore chaffed among "the little masters." The most remarkable of them are, "A Crucifixion, with St. John, the Virgin, and two Soldiers;" "The Virgin and Child;" "St. Christopher;" and "St. Laurence in Converstion with St. Angolfin." These are all of the circular form, and each about two inches and a quarter in diameter.

The principal wood cuts by the younger Schauflein are as follow, "Adam and Eve," a small upright; "Lot and his Daughters," a middling-sized, print, length-ways; "Christ preaching to the Multitude from the Ship;" a middling-sized print, length-ways, marked with an I and an S joined together, without the peel; "The Life of Christ;" a set of middle-sized upright prints, in quarto; another set of "The Life of Christ," in an octavo volume, consisting of 27 prints, entitled "Vite et passà del Christ," &c. published at Francfort by Christian Egonolphus, A.D. 1537. To these are added, "Historia Evangelica," containing the miracles, parables, &c. of Christ, in thirty-six prints, the same size as the above, and printed on both sides. These are marked with the I and S joined together upon the peel.

This artist is presumed by Strutt to have also engraved on copper; but perhaps "the very free etching of a landscape," if not the plate executed with the graver, of "Soldiers converging," of which this author treats, may be the work of a third engraver of the same firm. The date of the latter is 1551, and Strutt has previously recorded of the third Schauflein, that he has seen by him a print of two men lighting, cut on wood, in a coarse but spirited manner, and a very fine masterly etching in the style of a painter, representing a large company at an entertainment in a garden, which prints prove him to have been a man of great abilities. He was probably of the same family with the former two.

In the year 1493, appeared the celebrated Chronicle of Nuremberg, which was compiled by Hermann Schedel, a folio work, ornamented with a considerable number of engravings on wood by Wilhelm Pleydenwerff and Michael Wolgemut. These engravings are greatly superior to all that had previously appeared in Europe, and confit, for the most part, of figures of various kinds, and landscapes which, though professedly views of certain cities, towns, &c. bear to little resemblance to those places respectively, that they are probably altogether the work of fancy. They are, however, cut in a bold and spirited style, and the characters of the heads are in some instances far from being bodily delineated, though that meagre Riffines is everywhere prevalent, which so strongly marks the early art of Germany.

Pleydenwerff was a native of Germany, and perhaps of Nuremberg, but it does not appear that he ever engraved on copper, or used any monogram or other mark by which to distinguish his engravings from those of his associate.

Michael Wolgemut, or Wolgemuth, was born at Nuremberg in the year 1434. He is said to have been instructed in engraving by a certain Jacob Walch, but both Strutt and Huber doubt this fact, grounding their doubt on the want of resemblance between the styles of design and engraving of these two masters. Walch does not appear to have engraved at all upon wood, whereas Wolgemut did little else. The engravings on copper attributed to Wolgemut do not bear even a distant resemblance to those of Walch. The latter was a tame artist, or rather workman, and his work characterized by labour and care, which is generally ill bestowed; whereas Wolgemut may even be termed an artist of genius, a word, by the bye, which seems to betray down the argument of Strutt and Huber, since if a man of genius could work under a mere manual workman, as by chance he may, he will certainly emerge from the style, or want of style of his master.

Wolgemut did occasionally engrave on copper, but his works on wood are far more numerous, and more generally known. In Strutt's account of this artist, he says, "we have some few excellent engravings on copper, executed about this time: these have much of that spirited style in them which appears in the wooden cuts of Wolgemut; they are marked with a W surrounded by a small circle, and these prints, I verily believe, are the production of his graver."
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He proceeds to describe one of the rarest and best of these prints which he found in the collection of the late Dr. Monroe. It is ten inches and a half high, by seven and a half in width, and represents an old man seated in a praying posture. He has a standard reeling upon his left shoulder, and a book before him. Behind him is an armorial shield, with three different bearings; and, at the bottom, a cave with a gate before it. Above the figure is a scroll, upon which is written, "See Wilhelmine Dux Aquitaine et Cornes Della-viensi." The head of this figure is well drawn; the hands are marked in a spirited manner, the folds of the drapery are broad, and boldly expressed, and the whole is composed in a style which does much honour to the artist. With respect to the mechanical part, it is executed with the graver only, in a dark, clear style, yet without formality, so as to have the effect of a neat etching.

It is no small addition to the honour of Wolgemut, that he was the tutor of Albert Durer, a name to greatly celebrated in the annals of engraving.

Arrived at the period when engraving both on wood and on copper began to shine forth with superior lustre in Germany, it is necessary to look back a few years in order to note the introduction of the latter branch of the art, into that part of Europe.

The reader will find under the article Italian school of Engraving, the popular and perhaps the true account of the discovery of the mode of printing from the incisions of the graver, which, soon after the middle of the fifteenth century, was introduced into Germany. As the first engravers on wood were the manufacturers of playing-cards, (called Formelsniders and Briefsniders in Germany and in France,) so the earliest modern engravers on metal, both in Germany and Italy, were goldsmiths, and the first artist who eminently distinguished himself in the former country was Martin Schöen.

Yet having already mentioned Jacob Walch of doubtful chronology, it may not be improper in this place to add, that this engraver was particularly fond of introducing Gothic architecture into his prints, in the delineation of which he took no small pains; but, from a want of knowledge in perspective, his designs of this kind are sadly confused. He drew very incorrectly, and his compositions are in the extreme of that stiff and meagre taste which characterizes the early productions of the German school. His mark, consisting of the initials of his name and a kind of lozenge crosses, may be found in our first plate of monograms, &c. of the German school of engravers; but it is to be observed, that there are some few prints marked with the crosses only, which have the appearance of being more ancient than those which are marked with the W and crosses.

Of the former kind are, "a hairy, wild, Man fighting with a Bear," and "a Woman seated, carressing a Unicorn," both small, and of the upright form.

Of the latter kind (marked with the W and crosses,) a Gothic ornament for a crosier, a large upright; "The Inside of a Gothic Edifice," a middle-sized circular plate, "A Ship striking against a Rock," with the inscription, "Haezdre" in German text, a small plate; a set of military subjects, small, and another of saints standing in Gothic niches, small uprights; "Three Skulls in an Arch," ornamented with Gothic work; and "The Genealogy of Jesus Christ," wherein saint Elizabeth appears on a throne, reading, with the Virgin Mary and infant Christ below. On the right hand is David with his harp, and on the left Aaron. Behind the throne arises a genealogical tree of the lineage of Christ from David to Joseph, represented (as usual) by half figures. This is a large upright print.

Martin Schöen, or Schön, or Schöengauer, called by the foreign writers on art, Le Beau Martin, or Hubert Martin, and misleadingly called by Vafari Martin of Antwerp, was born at Colmbach, a small city in the circle of Franchecon, in the year 1430. He was educated a goldsmith, and a certain Lutrecht Rush, and Frens Van Stofis, or Stolzhirt, have been mentioned as his tutors. At the age of forty, and probably before, he distinguished himself by extraordinary powers in the arts of painting and engraving, particularly the latter, and died at Colmar in 1486. His prints are without dates, but he, rather than any other man, may claim the honour of having been the first to practice the art of engraving on plates of metal, with a view to their being afterward printed on paper.

Schöen engraved from his own compositions; his plates are numerous, and shew that his mind was fertile and vigorous. If it was not sufficiently vigorous to burst the Gothic fetters which at that time manacled the taste of Germany, his admirers may impose themselves by doubting whether the unassisted powers of any individual whatever would have been found adequate to do difficult an occasion. The tyranny of established custom is probably not less firm and unrelenting in the arts of design than in those of education.

How the stiff and meagre manner,—the angular draperies and concealed forms which characterize the early productions of the German school, came to prevail among the Gothic and Celtic nations, for whom they derived them, is a curious, and perhaps not an unimportant question. By comparing the early efforts of art in all nations of which we have any memorials, we may be led to infer, that man has gradually learned to see objects as they really exist in nature; the images pictured on the retina of the eye appear to be refracted in their transmission to the intellectual retina, and in every country continue he so refracted, until, as the sun of science slowly ascends, the morning density of the mental medium is gradually rared; it is not left observable, nor a less curious fact, that a similar haggardunk is in the attempts of man in an uncivilized state, to imitate the human form, has almost universally prevailed, even in ages and climates the most distant from each other.

The early art of Egypt, Peru, and Hindoostan, agrees in meagreness with the rude efforts of the Mexicans and South-sea islanders; and with the German art, derived from the Gothic and Celtic nations, which is now under our observation.

In the time of Martin Schöen, and Albert Durer, German art was much in the same state with European ethics; theory was separated from practice; and both art and philosophy remained perplexed with false analogies, metaphysical jargon, and occult nonsense; till Bacon, and the resurrection of the antique, referred them to the results of experience, as a criterion of principle.

Neither lord Orford then, nor any other man, should have displeased either Schöen or Durer, for not having done, what no artist of any other school has of himself been able to perform: for, not only neither of these founders of the German school, but none of the early Italian masters, has shown that he possessed the penetration to see beyond this giddy exaltation from the barbaric ages, till the great examples of classic art began to re-appear, and reflect back on Nature the light they had received from her.

The works of Schöen evince a strong mind operating on the co-existing state of things, brooding over the abyss from whence the future elements of his art were to be created; and ming with considerable success the materials by which it was surrounded; and it may be regarded as fortunate for
his claims, that in the instance of his St. Anthony he has adopted a subject that in its nature is free, or nearly so, from the Gothic bondage with which, on other subjects, his genius was shackled; but he has boldly ventured into the regions of Chimeras, and by the potency of his art has compelled thence the demons that Calmet and Teniers were afterward solicitous to induce and provoke to employ; while the expression of undisturbed faith and pious resignation is the commonplace of the holy man whom they are hurrying into the air, shews that he saw and copied that portion of Nature which did vouchsafe to unveil to him, with a clear vision, and delicate, though determined, hand. If his demons are more fantastic and less terrible than modern art would deem it proper to introduce, we should recollect that the age of Schoen was that of Ariosto, and that two centuries elapsed between the grotesque monsters of Ariosto, and the sublime demonology of Milton.

It is consonant to the progressive improvement of critical observation, that more should be known of the human countenance at an early period, (or indeed at any period,) than of the rest of the figure, because it is the kind of study and observation in which men are most interested. Accordingly, Schoen's heads are in general by far the best parts of his performances. Those of his single figures of St. Martin and St. John have considerable merit; the divine character and expression of that of his Christ bearing his cross, as it appears in the good impressions, have rarely been surpassed; and several other heads in this extensive composition possess a proportional share of excellence.

In this, as well as in several other of Schoen's prints, may be traced a latent feeling exuding in the mind of his author, that the engraver's art might be rendered subservient to the expression of the various textures of substances. Nay more; this elementary principle strongly discovers itself in the manner in which he has treated the grain of the wooden cross; in the various modes he has invented of describing the different materials of drefs in which the figures are habited, and in the fertility of the ground; perhaps the latter is as much the result of the necessary operation of the uneducated graver, as of study. Yet, is it in such full concord with the barrenness of the scene, and the barbarism of the subjeet, as to be not unworthy of favourable notice; while, the whole together seems to shew that a sentiment has descended from the commencement of engraving, that it was susceptible of this particular merit, and which may therefore be fairly presumed to have not fallen in the fallacious refinements of modern fashion, (though perhaps sometimes run after with too much of fashionable avidity,) but one of the primary elements of the art.

The mark which Martin Schoen affixed to his works may be seen in our first plate of the monograms, &c. of the German school of engravers. Heineken has enumerated an hundred and sixty of his engravings, most of which are much admired and desiredly sought after by connoisseurs. We shall begin our select hit with the mention of those of which the subjeets are taken from facred history.

A Nativity, where the Virgin Mary is in the act of adorning the infant Saviour, who is lying on a straw pallet; behind the Virgin appears a bull and an ass; and in the distance St. Joseph. Three angels appear in the air, holding a torch.

Another Nativity, where Joseph is seen in profile, holding a lantern. The bull and ass are here looking at the infant Christ; the scene in a vaulted stable, where, through an opening, are seen three shepherds in conversation, and three angels hymning hallelujahs above.

On the same plate of copper, which is still kept as a curious curiosity, and may be seen in the chapel of the hospital at Cologne, is likewise engraved "The Adoration of the eastern Kings." The scene here is also in a stable, where the kings are kneeling and offering presents to the infant Saviour, who is held by the Virgin Mary. This plate is very skilfully executed, and is of a small folio size.

"The Flight into Egypt," in which angels are represented afflicting St. Joseph to gather dates, and lizards are introduced with both local and allegorical propriety, one on the ground, and two others climbing up a tree. This also is in small folio.

A set of ten plates of "The wife Virgins," and "The foolish Virgins," small uprights. The former bear their lighted lamps in their hands, and are crowned with garlands of flowers; the latter are trampling on their garlands, while their lamps also are on the ground.

A set of twelve small squares from the life of Christ. In the first he is represented in prayer on the mount of Olives; in the second, arrested by the government; in the third, before the high priest; in the fourth, solders are scourging him; in the fifth, he is crowned with thorns; in the sixth, Plate 7, is his crucifixion; in the seventh, he is exhibited to the multitude, in the eighth, bearing the cross; the ninth is the crucifixion; the tenth the holy sepulchre; the eleventh the descent into hell, and the twelfth the Resurrection.

A large folio of "Christ bearing his Crosses," one of the most celebrated of the engravings of Schoen, and on which we have commented above.

A Crucifixion, also in folio, and which has been copied by Israel von Mecheln. The Virgin Mary and St. John are in this print represented at the foot of the cross, and angels in great affliction; "The last Judgment;" a set of twelve middle-sized uprights, of which the subjeets are taken from the life of the Virgin; "The Death of the Virgin," ditto, which has also been copied by Von Mecheln and other contemporary artists, and is a composition of confiderable merit, and one of the most carefully finished engravings of the maker; "St. Anthony hurrying into the Air by Daemons," a very capital work, of which we have already spoken, an upright folio, but not very large. A set of the apollies, very small, in folio, of the Nativity, Schoen has engraved "The Alchemists fighting," "A Bishop's Crozier," in folio, in the spiral volute of which is the Virgin Mary with the infant Christ, and an angel playing on a lute; an incense-cup or center with a chain, ditto. Twelve small plates of goldsmiths' ornaments, consisting of armorial bearings with their appropriate supporters, &c. cloathing an eftecheon, bearing the cypher of the artist himself, supported by a female; and "The Battle against the Saracens," in which St. James appears on the part of the Christians; a large folio plate, presumed to have been the last of Schoen's engravings, from the circumstance of certain distant figures toward the left hand corner being left in an unfinished state.

Bartholomew Schoen is said, by professor Chrift, to have been the brother of Martin, but of the dates of his birth and death we find no account. His apparently very ancient engravings are known by his initials, having between them a mark of separation exactly resembling that which precedes the initials of Martin Schoen, which confirms the probability of their having been brothers.

The engravings of Bartholomew bear that sort of resemblance to those of Martin, that a bad copy does to a good original, and in neatness and feeling are exceedingly defective. They are partly original, but the greater number are copies from the very superior prints of his brother.
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His original works consist chiefly of grotesque figures, of which some are by no means deficient of humour. It may be necessary to mention the few following, which are all engraved on small plates.

A beggar man, with an old woman in a wheelbarrow; a man playing on a lute, with an old woman holding a ladle and jar; two grotesque heads of an old man and woman, marked in a better style than the former; and a lover and his mistress, a small circle.

He copied the life of Christ, the large folio of the Gospels bearing the crosses, various other plates of the prints of Martin, but the copies may be known from the originals, by their inferiority as well as by the difference between the two signatures.

When a man of original genius, or one who may claim that noblest of human distinctions, the title of inventor, flourishes forth on the world, a swarm of busy flatterers round his glory are kindled into existence; buzz in his rays, and think to share his fame. Such was Bartholomew Schön, when confided with reference to his brother; such probably were Paul and Georg Schön, who have been mentioned as goldsmiths and engravers of this early period, and such were those other contemporary imitators and immediate successors of Martin, who now claim some portion of our notice.

Of talents far inferior to those of Martin Schön, yet engravers to whose works the virtuous and not by means intelligent, were the Israel von Mechels, father and son, whom Strutt had mistakenly inclined to identify; as having been one and the same individual. Both were natives of Mechel or Mekenin, a village near Boholt, in the bishopric of Mindel, in Westphalia.

The elder Israel von Mechel (or Mekenin) was born in the year 1424, and, like Schön, he was by trade a goldsmith.

The year of the nativity of the younger Israel has not been mentioned. The latest of his engravings is dated in the year 1522, and he died in 1532. It has been conjectured, that he studied under Martin Schön, from the number he has copied of that master's works, but this seems very insufficient evidence of the fact. It rather seems to prove that the barometer of his invention corresponded with the dryness and fulness of his style as an engraver.

The works of the von Mechels (if the father engraved) are numerous. That he did engrave, is inferred by the baron Heinrich in the following circumstance.

"An attentive examination (he says) will make it appear that all these prints are not by the same hand. I am almost certain that Israel, the father, engraved several, those especially which have the greatest marks of antiquity, and are executed in a rude style, approaching nearest to the work of the goldsmith. Nor do I deny, that the son may have commenced originally as a goldsmith, by engraving armorial bearings, flowers, foliage, crosses, and other ornaments; but he was a painter as well as an engraver, and a man of tolerable ability, considering the time in which he lived."

Strutt, on the other hand, can find no reason for dividing the works which pass under this name, nor can he find any other difference in the prints than might reasonably be expected in the works of an individual artist, who performed to many of his most early productions being of course the rudest, but all equally defective where he has attempted to express the naked parts of the human figure.

The difficulty, and the importance also, of the question, ceases, when we reflect that it was part of the professional business of the goldsmiths of that day, in which every apprentice was instructed, to ornament their productions with engraving.

Of these engravings, so little worthy of learned controversy, the principal are: the portrait of the senior Mecken, an elderly man with a long beard, his head dressed with a turban. The plate is in quarto, and bears the inscription "Israel von Mecken, Goldschmit." Ditto of Mecken, junior, and his wife, inscribed "Figuracio facerium Ifrahelis et Ida Uxoris, I. V. M." in 8vo.


These are among the prints which Heinrich supposes to be the work of Mecken the father, and Strutt, the early productions of the son. They bear the evident marks of being the attempt of a novice, being wretchedly engraved and quite ill drawn.

"Judith and Holofernes," of the folio size. In the back ground is an army, where cannon and other modern implements of war are ignorantly introduced. "The Banquet of Herodias." This is a folio plate, twelve inches in length, by J. Schoen, V. M. At one end is the decalogue of St. John the baptist, and at the other, Herodias and her father appear seated at table. "Herod's Cruelty," is a middle-sized upright.

Of holy families, the Israels engraved several, the chief of which may be known from each other by the following peculiarities. In one, the Virgin Mary, habited in a long robe, is fitting with the infant Christ, while beyond an enclosure appears St. Joseph reposing. Toward the bottom, at the right hand corner, is a small grashopper, from which it has obtained the name of the Virgin of the Grasshopper. It is in quarto, and inscribed Israel V. M. (This plate has been copied, with improvements, both by Albert Durer and Mark Antonus.) In another, the Virgin Mary, seated in a landscape, is about to bless the infant Saviour; the Deity appears in the clouds above; and St. Joseph kneeling. (This is a middling-sized upright, and is partly finished by means of frets, which are apparently made with the point of the graver, somwhat in the manner of Rembrandt.) In another, which is dated 1490, the Virgin and Child are surrounded by four angels. This is also a middling-sized upright.

Of other sacred subjects, we shall mention "The Annunciation," in 8vo, where an angel appears holding a cornet, on which is the motto "Arc. Gra," and the Virgin is kneeling before a praying desk, on which is inscribed I. V. M. "The Death of the Virgin Mary," copied from Schoen. "The Virgin crowned by Angels, and standing on a Cenocent, while the fall of Satan is represented below," an upright folio. "The Scourging of Christ," ditto. "The Bearing of the Cross," a large folio, copied from Schoen, and two large folios of the "Crucifixion of our Saviour," which are distinguishable from each other by the following peculiarities: in the one, angels are receiving the blood from the wounds of the dying Saviour, while the Madonna and St. John appear below; in the other, which is esteemed the superior work, St. John holds a book in one hand, while the other is lashed, and the hands of the Madonna are clasped; and the ground in the latter is almost left white, whereas in the former it is nearly covered with engraving.

From the legends of the Roman Catholic rubrics, the younger Israel has engraved, "St. George and the Dragon," in 4to, inscribed I. V. M. Schon's "St. Anthony tormentcd by Demons," and "St. Jerome," in which the saint appears seated in a room and pointing to a skull.
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Full. On the right hand corner is the lion's head. The latter has been copied by Lucas von Leyden, and in the opinion of Strutt is Holbein's master-piece, though perhaps that distinction ought rather to be granted to his moral print of "A Cavalier and Lady, walking in amorous talk, while Death from behind a Tree is shaking an Hour-glass," a design which, whoever it is, original author, had previously been engraved by Strutt or Schauflink, and has been subsequently copied by Albert Duran and several others.

Of the angular design consisting of three naked women, with a globe hanging above, which is inscribed 8vo. there is also an engraving by Holbein.

A folio plate of "The Death of Lucretia," a pair in quarto, of "A Woman dancing, while a Man accompanies her on the Lute," and "A Man playing the Organ while a Woman blows the Bellows," both marked T. M.; Schön's richly ornamented incuse cup; and several plates of grotesque foliage and other goldsmith's ornaments, are all that we shall mention of the two hundred and fifty engravings by the Holbeins which are enumerated by Heinmck. Neither of them appears to have had any letted monogram, but marked his engravings variously, as we have stated in the course of our ill, sometimes adding to his name and reference the word "Goldschmit," and at others "Zan Beckholdt," in the German character. The best of their works, as has been hinted before, are copies from the superior productions of Martin Schöen.

Matthew, or Martin Zelger, Zafinger, or Zinck, goldsmith and engraver, was born in the year 1420, but in what part of Germany is not known, though from the subjects of two of his engravings, it may be guessed that he was of Munich: neither is the year of his death certain, though, that he lived to the beginning of the sixteenth century, and engraved till the age of seventy-five, may be inferred from the circumstance of one of his prints being dated in the year 1505.

The extreme of Gothic stiffness appears in his works. His composition is bad, and his drawing ill-wrks: the mechanical part of his engraving, indeed, possesses a certain degree of neatness, but it is without the faintest ray of taste. It is proper, however, to observe, that from the delicacy, or rather fancifulness of Zelger's manner of engraving, his plates would not stand many good impressions; that many of the retouched prints, which are exceedingly bad, are abroad in the world, and that therefore, to do justice to the slender sense of merit which he possessed, it is necessary to see the early impressions of his plates, nor should be left unmentioned, that in his latter engravings he displays a more intimate knowledge of perspective than we find among his predecessors in Germany. Zelger marked some of his prints simply with the initials M. Z. and others, as will be found in our first plate of the monograms, &c. of the engravers of Germany. Among his best engravings may be reckoned "Solomon's Idolatry, a middling-sized upright, dated 1501," "A Holy Family," in which the Virgin Mary is receiving water from a fountain, in a cup of the same date with the preceding," "The Legendary Story of St. Christoph, in which the Infant Jesus is given to the arms of the Virgin, a small upright," "A Lover seated in a Landscape, entertaining his Miltrefs," and "Two Lovers Embracing," ditto.

Two large and very rare folio engravings of "The Grand Ball and Tournament at Munich," in the former of which is represented a dance and card party, in which the duke of Bavaria is engaged at play, and in the latter a tournament, at which the duke is present. "The Martyrs St. Catherine and St. Ursula," both in 8vo. "The Martyrdom of St. Sebastian," in 4to. "The March to War," ditto, and "Aristotle the Philosopher," a subject often repeated, and called by some Socrates and Xantippe. The last is a very rare print, in 4to.

Albert Glockenton was a native of Nuremburg, born in the year 1452, and who flourished as an engraver at the commencement of the sixteenth century; but the time and place of his death are uncertain. Strutt says of him, that if he did learn his art from Schöen, he not only imitated his manner, but copied a great number of his prints; which copies constitute the greater part of the works of Glockenton. He executed his plates with the graver in a neat but fervile manner, by no means improving the drawing of his originals. He marked his engravings with a sort of half Gothic initials of his name, as may be seen in our first plate of the monograms of the German engravers, and sometimes added the date.

The principal works of Glockenton, after the originals of Martin Schöen, are "Chrift bearing his Crofs," and "Chrift crucified," both rare and of the folio size; "The Death of the Virgin." The feast of the wife and foolish virgins, ten plates; the Passion of our Saviour, a set of ten others, both of which are more particularly mentioned in our account of Schöen, and the "Virgin and Child at an Altar," in 4to. The latter is superior, in point of composition, to the German art of that period, is marked with only a Gothic G, and bears the very early date of 1506; which is perhaps the most ancient that is to be found on any copper-plate print whatever. Of this engraving particular mention is made under the article Glockenton, in the "Catalogue Raisonné of the Cabinet d'Estampes de Brandes."

Contemporary and co-equal with Zelger and Glockenton, was an engraver for whom Strutt claims a sort of doubtful existence, by the name of Wenzellaus of Olnutz, in Bohemia. He found a copy of Martin Schöen's "Death of the Virgin" in the Monro collection, which had not only the name of this artist inscribed upon it, but the date of the year in which it was engraved, namely 1501. He adds, "there is no doubt of its being a copy from Schöen, because it bears the evident marks of a fervile imitation. It is highly probable that Wenzellaus was the disciple of Schöen,"—"another observation arises from a strict examination of this print, upon comparing it with the ancient German engravings marked with the W only: which is, that they are evidently the work of the same artist as the preceding, though they have usually been attributed to Michael Wolgemut, the master of Durcr. The name is perfectly plain, but the words that follow are far less legible, and in the opinion of the present writer are much more like Olomuc ibidem than Olnutz in Bohemia."

Of these prints marked with the letter W only, Strutt mentions the following:

The "Annunciation," where the Deity appears above and a pot of flowers is introduced on the fore-ground; a small upright; "The Cavalier and Lady headless of Death;" "The Last Supper;" "The Crucifixion of St. Anthony," small and nearly square; and the set of small uprights from the "Life and Passion of Christ." 

The above are all from Schöen; those which follow are from the Izraels of Mckenin.

"An old Man leading a little Boy, with a Woman following carrying a Girl at her back;" and "A Lover entertaining his Miltrefs;" two small uprights; and "The naked Women with a Globe suspended from above."

We are now again arrived at the time when the Nuremberg Chronicle was published, and those extraordinary works both on copper and on wood began to appear, which are known to the world under the highly respected name of Albert Durcr.
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Of the various powers of Albert; his reputation as the father of the German school of painting; and his general merits as an artist, we have already treated pretty much at large; (see Durer, Albert.) It remains to add our lift of his principal engravings, and to comment more particularly on some of those which are, and deferre to be, most conspicuous. Though the defects of the artist are pointed out in the critical remarks which follow, and which are chiefly extracted from lectures delivered at the Royal Institution in the years 1850 and 1856, yet are they calculated to lead the attentive observer to a more intimate acquaintance with the merits of this extraordinary engraver, and to confirm the general and justly merited praise which has now, for three centuries, been bestowed on Albert Durer.

The resemblances between the several objects which this master has introduced into his engravings, and their archetypal nature, proceed, for the most part, too much upon facsimile principles for the generalized dignity of his subjects; and his powers of imitation are too prodigiously lavished upon subordinate and unessential parts.

The expression of his figure of "Melancholy," which would else have approached sublimity, is considerably injured by the introduction of a multitude of objects, most of which the mind does not readily assimilate with the sentiment of melancholy. It must first be perceived or discovered, that these objects are allusions to astrology, alchemy, and the occult sciences, as they are called. The performance addresses itself, therefore, to the curious and inquisitive part of mankind, and not to man: and as neither the eye nor the mind can at once dilate with grandness and descend to littleness, it is evident that the research it requires must be the destruction of sublimity.

Though there is nothing of the "holy calm," with which Collins has surrounded his figure of melancholy, this composition may still be thought interesting on another account, namely, as a true picture of the times in which it was engraved; for precisely thus was attention perplexed and deflected on most philosophical subjects in the age of Albert Durer; and as he is author of seven treatises, most of which are on the metaphysics of art, he had probably experienced much of that species of melancholy which proceeds from the mental exhaustion and dissatisfaction in which such studies often terminate. Regarded in this view, it is no inapt verification of the old adage, "The painter paints himself." It might have aspired to reconcile us to the defects of this performance, if Albert Durer had named it Study; or, if we could fancy the figure out of the picture, we might be content to let our attention dwell awhile on the skill with which he has represented most of the other objects, when abstractedly and severally considered. This talent, however, of representing the characters and textures of individual objects, is still more conspicuous, and somewhat less objectionable, in the print of "St. Jerome in the Room," wherein all the objects are rendered with a fidelity little short of the camera obliqua. Regarding the art as in its infancy, we may look at this engraving with the fame kind of pleasure, and we should at all the works of art in this period, with the same candid indulgence, in which we look on his contemporaneously "The Virgin and Child" by Van Eyck, in the cathedral church of Bruges — "the artist," says Jollens, "having accomplished the purpose he had in view."

Another of the most celebrated, though not the best, of Durer's engravings, is his "Adam and Eve." He has, in this instance, had recourse to nature for his models, but his Eve is not "the fairest of her daughters," nor his "Adam the goodliest of men since born;" yet we may perceive that he selected from the nature with which he was acquainted; and though we do not behold the symmetry and superlative grace of Greek beauty, we probably see the refined and acknowledged beauty of Nuremberg. It will also be allowed, that the Paradise they stand shortly quit, does not seem very desirable to inhabit; here is no genial light, no luxuriance of vegetation, and no abundance of animal life. To use more of the words of Milton, nature is far from wanting as in her prime; — to very far from playing at will, or fancies, which the appears, in those of Shakespeare, "hail with dry antiquity;" yet if Raphael has violated this cardinal principle of propriety, by erecting a church, and houfes two stories high in his Paradise, who shall throw the first stone at Albert Durer? The holes of his trees, though among the first, if not the very finest that were ever engraven, have much of the truth of individual nature, and their foliage, and the fur of the cat, are expressed with a degree of freedom that must surprise those who reflect that no etching has been attempted, and how comparatively ill calculated are the fleck and shiff lines of the unaided graver to the expression of such objects. The introduction of the cat and mouse in Paradise could not fail to be understood, from its familiarity; but though ingenious, this very familiarity rendered it unfit for the occasion. The prophet Isaiah has far more nobly expressed the primordial harmony and happiness of the brute creation.

The Eve of Albert Durer is apparently of the same family that Otho Venius, and Rubens, afterwards adopted for their models; and in the engraving which collectors call "The Death's Head," is a female figure, which still more evidently shews the esteem in which Rubens must have held the works, or at least the women, of Albert Durer. It is not easy to conceive the occasion that could have given birth to this mysterious print of Death's head. It presents us either the ordinary routine of human life in allegory, or perhaps a fort of poetic armorial bearing. The head is a winged helmet, richly ornamented, and beautifully designed; and though a skull, which one should think could not fail to be an avuncular looker, is highly embossed on the shield, the female supporter, heedles of her charge, heedless of the moral lesson, and of the moral character the shield sustains, is obviously listening to the very suspicious suggestions of a fort of savage man. It appears to be one of the night thoughts of Albert Durer, and perhaps, like those of Dr. Young, may be intended to mark the lamentable influence of the grosser passions. Whatever its author may have intended to inculcate by this print, its execution as an engraving is admirable. The helmet, with all its pomp of heraldic appendage, and the actual and reflex lights on its polished surface, are characteristically, though minutely, expressed; the skull is accurately drawn, and its bony substance is described with a masterly hand; the author has even sedulously attended to the finer enamel of its two remaining teeth. The head of the savage, with its beard and wild redundantness of shaggy tangle hair, has considerable and well-managed breadth of light and shade, though its character is far less savage than should seem to belong to the soul of the figure: its expression is, doubtless, meant to be alarming and infatuating. The countenance of the female has seldom been rendered for so successful a mixture of character and expression that lends a willing ear to a delusive promise; and the hands of both figures are far better drawn than we have hitherto seen among the productions of the German school: the drapery also, which we have accustomed to see stiff, flarced, and complicated, is here relaxed into freedom and simplicity, and is so remarkable for flaky texture; approaches so near to what is now termed picturesque composition of forms and light and shade; and
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is, on the whole, so superior to that of his Melancholy, and some other of his subsequent works, as leaves us either to wonder that Albert Durer, having once attained, should ever lose sight of the excellence of its principles; or to infer that he did not perceive their excellence, or that the science he deduced from his own observation of nature prevailed but occasionally over the prejudices of his education.

In his small prints of the life of Christ, of which Marc Antonio is said to have pirated the copy-right, other instances occur of this style of superior simplicity in the draperies, and some of broad and captivating effects of light and shade. His Jesus Christ suffers greatly; or benings with God-like benevolence; his Magdalens and Madonnas are sometimes divinely pathetic; and many other heads in these interesting and often grand compositions, are exquisitely finished miniatures, remarkable for that sort of accordance and confidence of parts which we deem the internal evidence of truth and nature. The principal portraits of Durer, engraved on copper, are those of the elector Frederick of Saxony, dated MDXXIII. Albert, elector of Mayence, dated 1523. Birkhald Pirckheimer, dated 1524. Melanchton, dated 1525. These are of all the quarto size.

In folio he has engraved his friend Erasmus, good impressions of which are now become very rare, dated 1526, and two figures of himself, on the same plate, one being his portrait in the year 1509, and the other in 1517. They stand on either side of a piece of architecture.

Of the portraits of Durer, it may with truth be said, that, in point of drawing, they possess the same internal evidence of correctness which distinguishes the best of his historical heads: in style they are laboured; but the labour is not ill-begotten; and the chiaroscuro is frequently comprehensive and clear. His compositions from holy writ, and these legends which in his day were thought to be nearly of equal authority, are numerous. The principal of those on copper are "The Adam and Eve in Paradise, or Sin of our First Parents," which has already been the subject of detailed comment, a very elaborate work in folio, dated 1504. Another "Adam and Eve," which represents them after their expulsion from Paradise. "Adam crawling, and Eve sitting with an Infant at the Entrance of a Cavern," in quarto. "A Man with a Beard, seated on the Ground (his Horse fastened to a Tree) caressing a Young Woman," a small quarto plate, known by the name of "Judah and Tamar," and believed to be the earliest of Albert Durer's engravings. "The Nativity," where the Virgin Mary is adoring the Infant Christ, while St. Joseph is drawing water from a well. "A Holy Family," known, among connoisseurs, by the title of "The Virgin of the Butterfly," where the Magdonna is seated in a landscape, with the infant in her arms, and St. Joseph asleep near her. Another, known by the title of "The Virgin of the Ape," where the Infant Christ, kneeling, is playing with a bird, and an ape is tied near the group. Another, known by the title of "The Virgin of the Pear," which is dated 1514, where the Infant Christ, holding a pear, is sitting with his mother at the foot of a tree. Another, known by the name of "The Virgin of the Apple," which is dated 1514. All of them are of the 4to, dimensions. An etching of the "Holy Family," in folio, wherein the Virgin Mary is standing and holding the Infant Christ in her arms, and a girl is introduced at prayers, dated in the year 1519. A set of fifteen, including the frontispiece, entitled "The Small Passion," very rare, and dated from 1507 to 1512. "Christ Crucified, with the Holy Woman at the Foot of the Cross," a small circle, without the artist's mark, and said to have been done for the sword-belt of Charles V. "The Saviour prostrate in the Garden of Olives," very rare, and dated 1515. "A Group of Angels bearing the Inframents of Crucifixion, &c," engraved on tin, or iron tinned over, and dated 1516. "The grand Ecce Homo," in large 4to, with a Latin inscription, and dated in 1512, a very rare print, much sought after by connoisseurs. "The Entombing of Christ by the Holy Women," in small folio, a print dated 1507, and in which several cats are strangely introduced, but which some think is not by Albert Durer. "The Infant Prodigy," a kneeling figure, in folio, some pretend that this is a portrait of Durer himself. "St. Hubert at the Clafy," a folio print, in which the saint is represented kneeling before a crucifix, which appears upon the head of a stag; the scene is a wood, with a cottle at some distance.

Albert Durer has been analogically compared with our poet Spenser, and it has been remarked, that "if any one of his performances were to be pointed out as more particularly resembling Spenser, it should be that of the Legendary Tale of St. Hubert. They are characterized by the romantic heights of extravagance; the fame abundance of ideas; the fame unremitting and serviceful attention to minute excellence; the fame general air of incomodity rendered credible, and, as we should say now, if the works of the poet and engraver were now produced for the first time; the fame want of concentration, brevity, and general effect; but a temporary adoption of the sympathies of the sixteenth century, as far as art is concerned, reconciles us to thee."

Of the subject of St. Jerome, Durer has engraved two plates in small folio, on one of which, where the saint is sitting in a chamber, we have already commented; in the other he is kneeling before a crucifix, in a rocky desert, and the engraving is far less elaborately finished than the former.

"A naked winged Woman flanding on a small Globe suspended in the Clouds, holding in one Hand an elaborate wrought Cup, and in the other a Bridge," a folio print, known among dealers by the name of the Larger Fortune. According to Vafari, it should be called Temperance, according to others. Prudence; but, perhaps, Albert Durer meant it for the Guardian Genius of Nuremberg, of which city a bird's eye view appears beneath.

Another "Naked Woman on a Globe," in 12mo., called the Lefier Fortune. She holds a long stick and a thistle. The figure of "Melancholy," on which we have already commented. She is sitting, her head reposing on her hand, surrounded by various emblems, a folio plate, of exquisite workmanship, dated 1514. "The Dream of M. Wolgemut," where he is represented asleep near a frying pan: the devil is behind with a large pair of bellows, and on the side Venus, with Cupid walking on flints. "The great Satyr," who is attacked by a fawn whilst reposing with a nymph, a small folio, the work of the graver, and performed with admirable skill. "The Sorceresses," four naked women in a room: a globe, with the letters O. G. H. is suspended from above, and in an adjoining chamber appears the devil surrounded by flames: it is dated 1597. Baldi-mucci thinks it is the earliest of Durer's engravings. It is copied from Wolgemut, and is a rare print. "A Chevalier on Horseback, and in complete Armor, purified by Death on Horseback, (who is holding forth an Hour-Glafis,) and another Spectre:" this is a very highly finished and exquisite engraving, in small folio, of which good impressions are rare. It is by some termed "Death's Horfs," and by others, with more propriety, "The Worldly Man:" it is
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Dated 1513, and the impressions which were taken before this date was incribed, are much valued. “The Death’s Head,” of which we have already given a particular description, in small folio, dated 1523. Another heraldic subject of the same dimensions, depicting a lion rampant on a shield, and a helmet surmounted by a cock spreading its wings. “A large Horse,” behind which marches an armed man with boots, bearing a halberd, and another horse of more beautiful form, behind which marches another armed man with a halberd, having a griffin on his helmet: both in 4to., and dated 1505. “A dishevelled Sorceef, mounted on a Goat, and flying through the Air, with a Ditafl in her Right-Hand.” “The Predial Son,” a small upright folio, of which the impressions, before the date 1513 was added, are held in mild esteem.

Under the article Engraving we have ascribed the invention of this mode of art to Albert Durer. The earliest of his etchings, which bears a date, is called “The Rape of Proserpine,” a folio print, dated 1516, and in two years after this work he more celebrated etching of the march of an army, which has been called “The Cannon,” from a large piece of ordnance forming the principal object on the fore-ground: the scene represented is the entrance of a village, with a bird’s-eye view over an extensive country, and three Turks are introduced near the fore-ground. Both these etchings are reported to have been performed on plates of iron or steel; and the latter, which is now become rare, is among the largest of the works of Albert Durer.

The principal of those works of our artist which are commonly supposed to have been engraved on wood, are as follow:—The portraits, in folio, of Albert Durer, inscribed “Albrecht Durer counterfeft in facem alter des LVI.” without the engraver’s cipher; another with his cipher; the emperor Maximilian I.; a bull with numerous ornaments, inscribed “Imperator Cesar Divus Maximilianus Pius Felix Augustus 1519;” Ulrichus Varnbucle, a rare print, with the following inscription on a piæf, “Albertus Durerus Noricus reddere que conatur 1522.”

From the numerous historical works which Durer performed, we select the following: A set of thirteen folio prints, including the frontispiece, from the life and paflion of Jesus Chrifti, inscribed “Paffio Domini, &c.” dated 1510, 1511. A set of twenty-seven small uprights, known by the name of the Smaller Passion, and inscribed “Figurae Paffionis Domini Noftri Iefu Chrifti 1519, 1520.” An “Ecce Homo,” in folio, engraved in a bold and broad style, and with great freedom. “The Holy Trinity, surrounded by the Angelic Host,” and dated 1511. Another “Ecce Homo,” known by the title of “The Mystery of the Mafs.” A set of sixteen folio pieces, inclusive of the frontispiece, of which the subjects are taken from the Apocalypse, and the text printed on the reverse of every leaf. A set of twenty-two small folio prints from the life of the Virgin Mary, dated 1509, 1511: seventeen of this beautifal set of engravings were copied by Marc Antonio at Venice, to all of which copies, except one, the Italian artist added the cypher of Albert Durer. “The Holy Family,” of the folio dimensions, where St. Anne holds the infant Saviour, and the Virgin Mary in the act of adoration. “The Rhinoeserous,” a rare print, in folio, with a German inscription, dated 1515.

In chiaroscuro (or chiaro-fecuro) printed from a succession of blocks, the following are ascribed to Albert Durer: “A Holy Family in a Landscape;” two angels are crowning the Virgin Mary, and on the fore-ground are three rabbits; in large folio. Two, of legendary stories from the lives of St. Augustin and St. Christopher, in large folio, the latter of which is scarce. A sort of apotheosis of the emperor Maximilian, where, accompanied by the Virgin Mary and numerous saints, he is adorning the Saviour (Of this piece Huber possefls an impression on vellum very richly coloured.) A pair, which are scarce, of “A Fortrel in a Plate of Sieges,” generally called the Siege of Vienna, dated 1527. A set of fix ornamental designs for tapestry, of astronomical subjects. The whole number of engravings by Albert Durer, and after his deigns, are flated to amount to 1274; but Marliette’s collection amounted to no more than 420, which were sold at his death for 1850 livres. See the article Durer in the Catalogue Raifonne of the Brandes cabinet.

The triumphs of the emperor Maximilian, which, when pasted together, form two very large and long prints of the frieze form, have been generally ascribed to Albert Durer, but the refarches of Mr. Duce of the British Museum, and Mr. Edwards of Pall-Mall, have determined that they are the performances of various other artists, though perhaps executed under the general superintendence of Albert Durer.

Lucas Cranach, or Cranach, was born at Cranach, in Welfphalia, in the year 1472 or 1474, and died at Weymar in 1553. He was educated a painter; yet whether he studied under any other master than his father has not been recorded. He pasted several years in the service of the elector of Saxony as an artist, distinguishing himself by his engravings on copper and wood, and in that manner which is technically called claire-féce. His fertility of invention far outran his judgment: led away by the liveliness of his fancy and talent for composition, he took such forms as were before him, following the old Gothic taste which prevailed in his country at the time, without attempting to improve it. His manner of drawing is rather dry and tasteless, than absolutely incorrect, but his heads have a moderate portion both of character and expression, though they are not marked with precision or in a pleasing style: his hands and feet are very defective, and a total ignorance of the art of distributing light and shade confuses his effects. The dragon is the crest of the elector of Saxony, to which, on some occasions, Cranach added the electoral shield.

The following will probably be found amongst the best of his engravings, beginning with those which are executed on copper: Portraits of Jean Frederic elector of Saxony, where an angel appears on high with a crown of laurel, in large 4to. and very rare. The two electors of Saxony, Frederic and Jean, the former of whom is holding a chaplet, in 4to, dated 1510, and almost figure, Christianus II. king of Denmark and Norway, surrounded by ornamental architecture, armarial bearings, &c. in larges 4to. Profile of Martin Luther in the habit of a monk of St. Augustin, inscribed “Des Lutertgenfalt,” in 4to, and dated 1523. The chief of his historical works are: “Adam and Eve after their Fall,” (called by some the Penitent of St. Chryfom) the scene is a desert, where a naked woman and child appear on the fore-ground, and in the back-ground a man is crawling, a folio plate, dated 1529, marked with the cypher and little dragon of Cranach, and executed quite in his Gothic manner. “The Temptation of our Saviour in the Desert,” where the Chrift is somewhat better pretentions to merit, than generally belongs to the figures of Cranach, but the tempter is as grotesque and entertaining a devil as you would wish to see; the print is in small folio, and marked L. C. W. the last letter devoting Wittenbourg: it
is very rare and bad. A whimsical composition, of "Je
fus Christ in the Clouds," surrounded by angels, and inspir
ing the electors of Saxony, a half length of whom appears be
d, a small print, almost square.

In chiaroscuro, that is, on two blocks of wood, the one
for the outline and darker shadows, and the other for the
dimmed lines and lights, Cranach has engraved "St. Christop
er carrying the Infant Christ over an Arm of the Sea," a foli
print, dated 1527. "St. George and the Dragon," a large
4to. "St. John preaching in the Desert," in folio, dated
1576. And, "A Naked Venus" (of ludicrous beauty) ac
 companied by Cupid, who is trying his bow, in folio.

The letter-press engravings of Cranach, commonly sup
posed to have been performed on wood, are as follows: Buil
of Jean Frederic, elector of Saxony; dittie of Martin Lu
ther in the costume of a monk of the order of St. Augus
tin, dated 1520; both in 4to.

Whole length portraits of Martin Luther; Philip Me
lanchthon; the emperor Charles V; the emperor Ferdinand
; Jean Frederic, elector of Saxony; and Jean Guillaume, duke
of Saxony, all of the folio size.

A half length of the elector of Saxony, holding a book
open before a crucifix, a rare print, marked with the little
dragon, dated 1552, and inscribed with a Latin sentence.

Of his historical works, the following are held in most
request among collectors. "Adam and Eve in Paradise, or
the Sin of our First Parents," dated 1569. "The Annun
ciation." "St. John preaching in the Desert," which has
been called a grand composition, and is dated 1516, and
the "Decollation of St. John;" all of the folio size.

A set of twelve in small folio from the life and passion of
Jefus Christ, inscribed on the title page "Paffo D N Jef
Chrifti ventillum imaginibus," &c. and dated 1569; this
set is highly esteemed among connoisseurs. Another set of
twelve, of the Martyrdoms of the Apostles, in 4to. and which
are held in high more request for rich composition and
expression of the heads, and are on the whole superior to the
preceding: they are dated in the year 1549.

It is curious to reflect on how frequent infrequency, the
Gothenberg artists of the age of Cranach selected subjects
that called for the introduction of beauty even of the highest
degree, and deftly out their virgin Maries and Venuses in all the fluff
magnificence of their age and country. "Paris visited by the
three Goddeses on mount Ida," a rare piece in large folio,
dated 1508. "Curtius leaping into the fiery Gulph" is also
in folio, and dated 1508. Three plates of tournaments, of
which two are called the great, and the other the little tour
ament, dated 1569; and a pair of park scenes with flags in
the rutting time, and which are very rare, conclude our
list of the engravings of Lucas Cranach.

Hans or John Burgkmair painter, and engraver on wood,
was born at Augsburg in the year 1474. He resided under
Albert Durer and some of his engravings are dated fo early as
1516, but the time and place of his death are unknown.
He engraved chiefly, if not entirely on wood, and his prints
possess much of the fire and spirit which distinguishes those of his
master. Professor Chriilt attributes to him some small spirited
woodcuts which were made for the ancient edition of the works
of Geyler de Keiferberg, which bear the above date (of 1510),
and are marked I. B. Many of the works of this artist bear
his name at length, the rest are marked with one or other of
the two cyphers which will be found in our plate of the
monograms, &c. of the German school.

The following are the engravings by Burgkmair, which
are most sought after by collectors: "The Emperor Maxi
milian I. on Horseback;" of which design there is a dupli
cate engraving in clare obscure, which bears the name of
Joel de Negker, but which is partly the work of Burgkmair.
It is a very rare print, dated in the year 1508, both of the
folio size. "St. George on Horseback," also bears the
name of Negker, and is of the folio size, and in clare obscure.
"Joseph and the wife of Potiphar," is of a figure form,
Sebastian," dated 1515, are all in folio. A young
Woman mourning the loss of a Hero that Death has over
come," is a rare print in folio; by Burgkmair and Negker.

The remainder of the letter press cuts of this artist are,
for the most part, hundred and thirty-five blocks or plates,
which were engraved on wood, and which were brought to Eng
and; within these few years have been removed to the Imperial
library at Vienna; its title is "Der weifs Konig" (the
wife king), and it consists of the distinguished acts of the
emperor Maximilian.

"The triumphal Entry of Maximilian," consisting of one
hundred and thirty-five blocks or plates, have remained for
a long period of time unknown at the castle of Ambra,
but within these few years have been removed to the Imperial
library at Vienna, since which impressions have been taken,
and several sets have been brought to England. Many of
these engravings are the work of Burgkmair, and are
marked at the back with his name or initials, though the
whole generally passes under the name of Albert Durer, and
were probably executed under his direction. Another work,
executed by these artists conjointly with Hans Schaufelb,
was called the Tewerdans; but the greater number of the prints
contained in it are from the graver of Burgkmair.

Johannes, or Hans Baldung, named Grun or Grum,
painted and engraved for the letter press and in clare obscure.
He was a native of Gemund in Suabia, and was born in the
year 1476. He flourished as an engraver through the
earlier part of the sixteenth century, and the latest of
his works is dated in the year 1534, but the time of his death
is uncertain.

His engravings are executed in a bold style, and with con
 siderable power over the instruments of his art. Strutt says
of him, that "his figures are rather expressive than correct;
the naked parts of them are poorly drawn; and the extre
mites, though free and spirited, are often heavy, and not
well marked," but considering the period and place at
which Balding lived, he may be regarded as a meritorious
artist. His engravings are sometimes marked with his name
at length, and at others with the cyphers which we have
given in our plate of German monograms. His principal
works are, "Adam and Eve in Paradise." "The Fall of
Adam:" in the latter, a tablet is inscribed from a tree, bear
ning the motto "Lapidus humanus generis," and the date 1511.
Both of the folio size, and the Fall of Adam is a per
formance of merit in clare obscure.

A set of thirteen figures in small folio of the Saviour and
twelve apostles, dated in 1514, and marked with the artist's
cypher. "The Crucifixion," with the holy women and St.
John at the foot of the Crosses, in clare obscure. A set of
four small uprights representing the Effects of Love, or
Influence of Women, exemplified in the stories of Sam
on and Dalilah, Solomon's Idolatry, David and Bathsheba,
and Xantippa and Socrates, (called by some Arbitotle and
Phrynus,) dated 1515. "A drunken Bacchus lying at
the mouth of a Calk," in 4to. "The Sorcerefs," who is
mounted on a lie-goat, holding a cauldron. A pair, cut in a manly
style, of wild horses in a forest, with the name of Balding at
length, and the date 1534. Another pair of small land
scapes, which are said to be etched on plates of iron, and are
very rare.
Of Hans Bréfag, a designer and engraver for the letter presses, very little more is known than that he was contemporary with Baldung, and has sometimes been mistaken for him from the similarity of their cyphers, and their taste in designing and engraving. Mitating the numeral 5, in the dates of his engravings, for a 6, Strutt has placed him a century too late.

Thole of his works which are best known, are "Adam and Eve in Paradise," of the folio size; bearing the cypher of Bréfag, and the date 1519. A set of three of the 4to. dimensions, dated 1504; viz. "Christ on the Cross;" "Christ lamented by the holy Women," and "A dead Christ," with angels bearing him away. Another set of thirteen of the Sixteen and Twelve Apostles, also in small 4to. and the three Dillins in a landscape, dated 1513, a very rare print in 4to.

Lucas or Louis Krug, or Krugen, painter, goldsmith, and engraver, was born at Nuremberg in the year 1489, and died in the same city in 1535. He formed his taste, in designing and engraving, from studying the works of Lucas of Leyden, and drew the human figure better than many of his contemporaries, though his attitudes are ill chosen, and his draperies ill. His mark was a small pot or jug placed between his initials on a tablet, as represented in our first plate of the monograms, &c. of the German engravers, to which the date was in some instances added. His principal engravings are as follow:

2. "St. John the Divine, writing," while the holy Virgin is dictating to him from the clouds, and below is the ludicrous incident of the devil emptying the ink-horn of the faint. "Two naked Women contemplating a Skull and Hour glases," and "A naked Woman sitting with her Back towards the Spectator," with a city and mountain appearing in the distance; all small uprights.

Hans S. Handslein, the third engraver of that name, was born at Nuremberg some time about the year 1487, and died at Nureligen, a town in Suabia, in 1550. He studied under Albert Durer, and imitated his style with considerable success.


But few libraries have the honour of possessing a complete copy of this celebrated work, of which Melchior Pfingsting says, in the dedication to Charles king of Spain, that he had been most of the actions that are therein engraved and described, which in fact are those of the emperor Maximilian I. under the fictitious name of Tewerdanks.

Albert Altdorfer, whom some have mistakenly supposing to have been of Altdorf in Switzerland, was a native of Altdorf in Bavaria, born in the year 1488. His name is found in the regifter of the citizens of Ratibou in the year 1517, where, having passed the routine of preparatory civil offices, he was made a member of the interior Senate, and architect of the city of Ratibou, and where, in 1538, he died without issue.

Some of his pictures may yet be seen at Ratibou, and at the town house is preserved a complete collection of his engravings. The French call him "le petit Albert," pre- Sumptuously in contradistinction to the great Albert Durer, and because his engravings are small, for which reason also he is usually ranked with the "little masters." His merit was however not inconsiderable. He engraved both for the rolling-presses and letter-presses; but those which he did for the latter are his best performances. He polished a lively fancy, a free hand, and great facility of invention. Yet his style is German, and his drawing, though spirited, is incorrect. He marked his plates and blocks with the two forts of monograms which appear in our plate of the cyphers, &c. of the German school. One of these marks has been attributed to Aldegrover; but the evident superiority of the latter letter is of itself sufficient (independent of the cypher) to correct the mistake.

From the spirited wooden cuts of Altdorfer, Holbein, of whom we shall presently speak, is said, and probably with truth, to have derived great assistance in the progress of his studies.

Altdorfer's principal engravings on copper are the portrait of himself; and that of Martin Luther, in an oval, surrounded by foliage; the head of an infant, one of his earliest works, dated in 1527; "Adam and Eve in Paradise;" "Solomon's Idolatry;" "Dallah and Sampfon;" "Judith and Holofernes;" several small prints of the Madonna and infant Christ; a Crucifixion, with numerous figures; another with the Virgin Mary and St. John, both small uprights; "St. Jerome standing in a Cavern," where is an altar, book, crucifix, and a tablet, with the monogram of the artist; another St. Jerome among buildings, accompanied by a lion; "St. George combating the Dragon," two etchings of the death of Dido, and that of Lucretia; a pair copied from More Antonio, of "Venus accompanied by Cupid entering the Bath," and "Venus leaving the Bath:" these are small uprights and in a neat style. "Cupid Sporting with Sea-horses," "Amplion faved by Dolphins," dated 1572. A pair of "Lusciunae," and prefumptively, "Chastity," represented by a female sitting on an altar, and holding a sceptre, with numerous attendants bearing lanterns. "A Warrior precipitating himself into the Sea." A pair of small landscapes lengthways, one with rocks and the other with trees, which are touched with considerable freedom. The "Synagogue," with a Latin inscription; and two plates of ornamented vases in 4to.

The number of engravings by this master, which are supposed to have been performed on wood, is considerable, probably exceeding a hundred, of which the following are most valued:—A set of forty of "The Fall and Redemption of Man," small uprights, executed in Altdorfer's best manner, and much valued; but collectors should be careful not to admit into their portfolios, instead of these, a set of all but two are copied from Altdorfer, and which were published at Zuric A. D. 1661, under the firm name of Albert Durer. "The Sacrifice of Abraham," and "Joshua and Caleb," both small. "The Annunciation," ditto, dated 1513.

The four following are in 4to. "The Purification;" "The Muffle of the Innocents," dated 1511; "The Decolation of St. John the Baptist," and "The Refurrection of Christ," both dated 1512, and the latter esteemed one of the most spirited works of the master.
The beautiful virgin of Ratibon, engraved from her picture in Ratibon cathedral, is engraved in chiaroscuro, though some few impressions were printed without the half tint: this is a rare print.

Of the often repeated subject of St. Jerome, Altdorfer has engraved two blocks, in one of which the holy man is kneeling before a crucifix in a cavern, and the other may be discerned, guilted by its very romantic background, both are small, but fairly held in edition. "St. George and the Dragon," and "The Judgment of Paris," both dated in 1511, and "St. Christopher and the infant Christ," are all in toto. A mountainous landscape with buildings, and a large tree on the right hand, another of a gateway, and a grand baptismal procession, a sort of allegory, where, inside of a church, the virgin and child, some angels, and a pilgrim appear in the procession, are all of the folio size.

Hans Holbein the elder flourished towards the close of the sixteenth century, and was of Augsburg; but afterwards removed to Basel in Switzerland. According to professor Chirill, he engraved on wood, and certain prints marked with an H., or the cypher H.B., the B being joined to the first perpendicular stroke of the H., are attributed to him; but Straut doubts whether they ought not rather to be ascribed to Burgkmair or Baldung.

The great celebrity of his son has reflected a steadier light upon his name. Hans, or John Holbein the younger, was born at Augsburg in the year 1495 or 1496, and died of the plague in London A.D. 1543. He was the pupil of his father, and gave earnest of his very extraordinary powers, at a very early age.

About the time of his father's removal to Basel, the genius of Holbein began to dawn on the arts of Europe. At this time, besides engraving, as has been said by various authors, for the letter-press in a very superior style, he painted portraits, and occasionally historical subjects in disinterest and in oil, and Erasmus, who was then superintending the printing of his works at Basel, came to fit for his likeness to young Holbein.

Being charmed with his portrait, Erasmus soon formed a friendship for the artist, and at his persuasion Holbein soon after travelled to England. He brought with him the portrait of his friend, and letters of warm recommendation to the great Sir Thomas More, who was at that time lord chancellor, and high in the favour of Henry VIII.

Holbein was received by the chancellor in the most friendly and flattering manner, and the family of the Mores, besides several other pupils of distinction, and finally the king himself, honoured our artist by fitting him for three portraits. Patronized by Sir Thomas, and possessed of such talent in the arts as had not appeared in England before, he was readily received into the royal service upon very liberal terms, and so proud was Henry of the abilities of his proteges, or so just to the claims of his genius, that he frequently sat to him for his portrait, and the glory which we have related of the condescension of the emperor Maximilian to Albert Durer has been often repeated of king Henry and our artist.

After the death of Henry, Holbein still continued to enjoy the royal favour, and several portraits of Edward VI. from his hand are still extant.

The career of Holbein was short; but as the poet on a less interesting occasion has beautifully said, "the sands of his hour-glass were diamond-sparks," which, as they fell, glittered in the radiance of his reputation. He died, as we have before mentioned, of the plague, in his apartments at Whitehall.

For an account of his merits as a painter the reader is referred to the article Holbein. He began engraving when he was about sixteen years of age, and very numerous and of extraordinary merit are the letter-press cuts which are laid to his hand, and after his own designs, which adorn the books that were printed about this time at Basle, Zurich, Lyons, Leyden, and London.

Holbein appears to have formed his style, probably under the direction of his father, from studying the works of his contemporary Altdorfer, who was now rising in reputation, though not more than ten years older than our artist, and it seems highly probable that the whole of whatever letter-press engravings are from the hand of Holbein himself, are the production of those fifteen years of his life which elapsed between the years 1511 and 1526, when he came to England, for it is not very likely that he would be led aside from the advantages of the royal and noble patronage which he enjoyed in England as a painter, by any inducements which the printers and booksellers of the continent might offer. Engaged in superior pursuits, the present writer is inclined to think that he did no more than design the little wood-cuts which are ascribed to him during his residence in our island.

The foreign writers on art, however, call him "the glory of wood engraving," and "the phenomenon of his age," adding that in order duly to appreciate his merit as an engraver, the connoisseur should not look at the hastily printed and worn impressions which are common, but should have before him, early proofs, printed only on one side the paper, such as were lately in the collection of M. Otto, an amateur of Leipzig, which, in point of delicacy, exceed all that had previously been exhibited.

His most esteemed production in this way bears the Latin inscription

"Cernere vis Hopfes simulacra simillima vivis?  
Hoc opus Holbiane nobile cernens manus,"

and consists of a series of ninety small letter-press cuts, of unequal merit, of which the subjects are taken from the Old Testament. The engravings that have been repeatedly praised on the whole, namely, that "holdness, spirit, and delicacy are united in their execution," are only applicable to the bolt of these cuts: the rest are scarcely, if at all, superior to the common place of the day.

The first edition of this work, which is commonly termed Holbein's Bible, is said to have been printed (at Lyons, by the brothers Melchior and Gaspard Trefchel) in the year 1539, and as this was thirteen years after the death of the artist, it is not easy to believe that these cuts are really engraved by Holbein, notwithstanding what is ascribed in the inscription: and they are on the whole inferior both in design and engraving to the "Dance of Death," of which we shall presently speak.

That the craft of publishers on such an occasion should have outlived the strictness of truth, and that a name which had revolutionised through Europe should be used as the trumpet of popularity and the means of profit, would be no very extraordinary occurrence. The work was for the multitude, and the multitude, on such a point, were easily deceived; nor could Holbein, if he were really the author of the designs, easily contradict the complimentary inscription:

"The Dance of Peasants," engraved from a picture which he painted in the fifth-market at Basle, and evidently before his departure for England, of which fine impressions are now become rare and valuable.

The cuts for "The Death of Folly," of his friend Erasmus, have also been ascribed to Holbein, besides several detached frontispieces, jewellery ornaments, and vignettes, and, lastly, we shall mention the "Imagines Mortis," or "Dance of Death."
GERMAN SCHOOL OF ENGRAVING.

Death," over Holbein’s claims to which the accurate research of M. Douce of the British Museum has thrown a shade of doubt that may not easily be dispelled. It consists of forty-six small upright prints, each surrounded by a double-line border, wherein Death, in the skeleton form, is poetically represented as leading off an individual from every station and condition of life, from the emperor in his imperial state, down to the meanest peasant; and the general moral which combines the whole is, that Death pays no regard to age, sex, or condition.

It seems proper here to be observed that these engravings are not taken, as Papillon, Strutt, and others have mistakenly supposes, from an ancient painting on the walls of a cemetery at Basil, and that this painting is not from the hand of Holbein, but is of much older date. The originals are drawings or small pictures which have been suppsosed to be by Holbein, between which and the large picture in the cemetery there is this material difference, that the former forms one long and connected procession of single figures, each led by a skeleton, whereas the latter is composed of separate groups, in which one or more living figures or skeletons are occasionally introduced, as hinted the views of the article, and altogether forming a series, the idea of which was doubtless suggested by the walls of the cemetery, and by the dances of death that were sometimes found painted in the crypts of ancient cathedrals, and of which there was one at Lubeck, another in the church of the Innocents at Paris, and another in our old cathedral of St. Paul.

Of Sigismund Holbein we shall say but little, for much could not be said to his credit. He was uncle to our Hans, and painted, and engraved on wood; but his powers were very inferior to those of his nephew, and even to those of his brother. The prints marked with the monogram, which will be found in our first plate of those of the German school of engraving, are ascribed to him, but Strutt doubts the fact of his having engraved them, nor does it much matter.

The cypher formed of an H and an L, which appears to that cut in the Imagines Mortis, of which the subject is called "The Duchess," is certainly not that of either of the Holbeins, and is very likely to have belonged to some German wood engraver, whose initials might be thus conjoined, who was the real engraver of the whole set of the Dance of Death, and who might perhaps be Hans Lederer, as is conjectured by Mr. Douce.

Bartolomeo Beham was born at Nuremberg some time about the year 1500, and, according to Sandrart, ended his days in Italy, a short time before the middle of the succeeding century. He travelled with Duke William of Bavaria, and became the disciple of Marc Antonio, under whose instruction he advanced rapidly in his profession, and whose style he imitated without implicitly following. He remained several years at Rome and Bologna, working chiefly in the excellent school of Marc Antonio, and incorporating with the careful and patient manual execution of German, the accurate drawing of his master, and the fine talents of Italy and Raphael. Strutt accordingly says of him, that “his drawing is correct and masterly; his heads characteristic, and the other extremities of his figures well marked.”

Sandrart states of this master, that in his time a great many of his engravings (presumptively engraved plates, and not impressions from them) might be seen in the gallery of the elector of Bavaria at Munich, and in the cabinet of the prince of Neubourg. The collection of the works of Bartolomeo Beham is however attended with considerable uncertainty, from the circumstance of many of them having been published with

out his name, monogram, or other mark. Strutt attributes to him the engravings that are marked with a small s, on which sometimes appears the letter B, whilst the abbe Marrois, Huber and Roff, contend that these prints are the production of Beatrici.

Of the works generally attributed to this master the following are the principal:—the portraits of William, duke of Bavaria; Erasmus Baldschuyn, at the age of 33, and Leonard van Eck, a counsellor of Bavaria, all in octavo. The emperor Charles V., at the age of 31, with the Latin inscription “Progenies divum quintus fice Carolus ille imperii Caesar et ora tulit;” and the emperor Ferdinand I., with the inscription “Proximus a fungo Ferdinandus Caesar Rex Romanorum fte turb oras genas,” both in quarto, and marked B.B. These are a finely engraved pair of portraits, and so much in the style of Marc Antonio, that Valfari thinks the portrait of Charles V. is really engraved by that master.

The best historical works of Beham are "Adam and Eve, with the figure of Death introduced into Paradise," "Judith beheading Holophernes," dated 1525, and in the style of Marc Antonio. "The Madama fucking the Infant Christ at a Window," (without the mark of the artist.) "A Sybil reading, and having before her a Boy holding a Flammbeau," (marked B. B. in four lines, and apparently after Raphael.) "Sufamah and the Elder," after Julius Romano. "The deaths of Lucretia and Cleopatra, both without the engraver’s mark. "The Judgment of Paris," with a dark back ground, a small frieze, representing a combat, and marked “Titus Querreus,” and another small plate of a combat, wherein soldiers are fighting with clubs, companion to the above. "An Infant carding a Dog," a small circle, dated 1525. Another Child, with a skull near him, marked B. B. and dated 1524. An emblematical piece, inscribed "Der Weif Laut," in which appears a half naked woman fettered, and asleep under a tree, an infant at her side, and a lamb at her feet; and an indelicate subject from Ecclesiastes.

Hans Schabd Beham, the cousin or nephew of Bartholomew, was born at Nuremberg in the year 1500, and died at Frankfort on the Maine in 1550. He is said by Sandrart to have studied under his relative, but Bartholomew went early to Rome, and, it must be remembered, was but four years older than Schabd; perhaps he merely learned of him what he knew, and afterwards studied with Aldegrever, of whom he shall presently speak, the works of Albert Durer.

He was obliged to quit Nuremberg on account of his libertinism, but settled afterwards at Frankfort; where, however, he relapsed into his former courses, and after engraving for some years, in the course of which the number of plates and tablets which he produced is surprising, he became the landlord of a tavern.

The German biographers of Schabd maintain, that when he established himself at Frankfort, he altered his monogram, by substituting the letter B for the P which he used at Nuremberg; they do not say he did it for the fake of concealment, and it may in some degree account for this variation, when we recollect that these letters are often orally confounded among the people of that nation. The Abbe Marrois, Le Conte, and the French writers, on the other hand, often call him Hifsens, and Schabd de Bohemis, for which we cannot so readily account.

Schabd Beham ranks defiderately high among the first masters; he engraved chiefly from his own compositions, which show a lively and vigorous invention, though sometimes impaired by the Gothic-german taste, which was then prevalent, and which chiefly appears in the crowded and inelegant folds with which he loaded his draperies. His drawing of the naked, on which he seems to have jullly prided himself, though not free from manner, is often
correct, and sometimes masterly; his heads are expressive, and his other extremities carefully determined. The manu-
part of his engraving on copper, executed with the graver
only, is clear and delicate. The prints which he first cut on wood are slight, but spirited and free, as wood engraving
ought to be; for wood engraving ought not to emulate the
delicacies and difficulties of the art of engraving on copper.

His two monograms will be found among those of the first
plate of the German school. From those which he engraved be-
tween the years 1519 and 1530, with the Nuremberg cypher,
we select the following: viz. the portraits of Sebald Beham
and his wife Anne, where his cypher appears encircled by
ranel. Two small plates of "Adam and Eve in the terrestrial
Paradise," dated 1519. "St. Jerome with his Lion holding the
"The Virgin of Ratibon," where he is represented standing
on a cresent, and surrounded by radiance, and "The
Death of Dido," all dated in 1520. "St. Anthony writing in
the Desert," and "St. Sebald, (the patron saint of Nure-
mburg), sitting among trunks of Trees, and holding in his
right hand the Model of his Church," both dated 1521.
"Two Phenomena," one of them playing on the violin, and
the other, a male and female Peafow Dancing," dated 1521.
"A Triton supporting a Nereid," dated 1523. "Force, allegorized
by a Woman sitting on a Lion," dated 1524. "A Young Man
fitting under an Ashbr unembracing a young Woman," dated
1526. "The Death of Cleopatra," dated 1529. An orna-
mented vase with an inscription. "A combat between the
Greeks and Trojans," inscribed "Kricken und Dronierun,,
and another combat, inscribed "Achilles und Hector,"
both small friezes.

Of those which S. Beham engraved at Frankfurt, between
the years 1531 and 1549, and which are marked with his
second cypher, the following are held in mould effem.
A vase enriched with sculptured ornaments, at the base
of which are two lyres, dated 1531. "Adam and Eve
carefully engaging," "Adam and Eve in Paradise," between
whom is Death, with a serpent wound round him, presenting
the fatal apple; a high finished plate, dated 1535. "The
emperor Trajan arrelled at the head of his Army." "Mar-
chiolo and Patience," two female figures, the former copied
from the celebrated engraving of the same subject by Albert
Durer, dated 1536. "The Virgin and Child," inscribed "Pa-
-"tiens," and dated 1540. Another pair, a Good-fortune and Evil-fortune, the former figure flanking and holding a wheel, the latter arrelled in her course by an evil genius, who is presenting her with a lobfiller or claw-fish.
An etching of a buffoon presenting flowers to a young
woman. A set of the four evangelists, dated 1541. Anoth-
er set of twelve of the labious of Hercules, dated from
1542 to 1548. "An Ensign beating a Drum," inscribed "Im
Baeren Kreig," small, and dated 1525. "A Roman Charity," very finely engraved, dated 1544. The arms of
Beham, as granted to the family by the emperor Maximil-
ian, a hexagonal print, inscribed "Sebalt Beham, von
Nurnberg, mähler, ject wohnhafte Bürger in Frank-
furt," dated 1544. Bust of Dominian in the manner of an
antique medal. A set of six, and a title-page of the months
represented by male and female peafows dancing, the last
feigned from behind by a naked Female," a beautifully finished
plate, dated 1547, with the following words inscribed on a
frame: "Ospexit homine venenum mortis alioque," "A Man
endeavouring to root up a Tree," dated 1549, and inscribed
"Impotibile, &c," and a virgin and child copied from
Bartholomew Beham, dated 1549.

The letter-precedents of S. Beham have not been thus carefully
arranged and separated. We select from them the following:

His own portrait in a bonnet and without a beard. A set
of eight from the Psalms of our Lord, two of which are
marked with his cypher, and two with his latter cypher.
An "Holy Family," in which St. Joseph is plucking straw.
"The Virgin and Child," "A Penitent," "St. Jerome with a
Billet and Crucifix," "Immortality," represented by a female
crowned with stars, and trampling on a skeleton, dated 1548.
A public bath of Anabaptists, of both sexes and all ages, of
the circular form. Another public bath, a large print on four
leaves. "A Village Fair" of the frieze form, and "A March
of Soldiers," also of the frieze form, and large; the four illu-
mentioned engravings are very rare; a set of three hundred
and forty-eight, engraved for "Biblica Historia Artifi-
ciofima depicta," printed at Frankfurt in 1537. But it is
to be observed that there are two editions of this bible,
of which the former is in Latin, and the latter, dated 1559,
is in the German language.

Gregory Peins, or George Penta, was also a native of Nu-
remberg, born in the year 1526. He first studied in the
school of Albert Durer, and profited much by the instruc-
tions of that distinguished master, but it was in Italy, and
under the direction of the great Frieri, Penta, that he formed
his style of engraving, and acquired that correctness of draw-
ing which we regard with so much admiration in his best
works. His plates are executed entirely with the graver,
which he handled with much skill, uniting with great pre-
cision a degree of freedom which was unexampled. He
appears to have worked on some of the best plates that pass un-
der the name of Marc Antonio.

The far greater number of the engravings of Peins are of
small dimensions; whereas he is usually classed among
the little masters but he has produced some few large
pieces; one especially of great merit, of "An Army passing a
Ditch, and scaling the Walls of a fortified City," after Julio
Romano; which, as Strutt has said, is "an admirable speci-
men of the artist's superior abilities."

Peins died at the age of fifty-six, but where, his biogra-
phers have not mentioned: his monogram will be found in
our plate of those of the German School; and the most
eclat of his numerous works are those which follow: Portraits of Gregory Peins and his wife on the same plate;
with the inscription, "Imago Gregori Peins Imagini Dux
German." From this engraving it should appear, that the
name it bears was the true name of our artist, and that the
name Georgius Penta, which appears under his large
plate after Julio Romano, is probably an error of the pub-
lisher Van Aelst. Portrait of Jean Frederic, elector of
Saxony, a rare print, dated 1543.

The belt of the historical works of Peins are, a pair of
"Ehther before Alahuzerus," and "The Temptation of
Job," another small pair of "Judith in the Tent of Hol-
onneus, and Judith appearing afterwards with his Head," anoth-
er pair, finely executed, of "Solomon's Idolatry," and
"The Judgment of Solomon."

Peins appears to have placed some judgment, at least some
humour, in pairing his prints; the next companions which we
have to notice, are "Sufanah solicited by the Two old
Men," and "Lot intoxicated by the Two young Women,
his Daughters."

From the history of the patriarch Joseph, we find a set
collating of four plates; another set from the history of
Abraham, seven, including the title-page, A pair of "The
Good Samaritan, and the Conversion of St. Paul." A set of
the Four Evangelists after Aldegrever, which bear the
cyphers of both artists. Another set of the Seven Works
of Mercy, of the circular form, and with German inscrip-
tions. Another set, very highly finished, collating of
twenty-five, from the Life of Christ. "Heredias receiving
the
the Head of John the Baptist." A pair of "The Rape, and Death, of Lucretia." A pair of "King Portmanns" pulling the Tiger, and Horatius Coclcs singly defending the Bridge." Another pair is a set of two plates, one illustrating the Life of Virgil, the other, "The Death of Cato," and "The Death of the Virgin." A set of three of "Two Musicians: Thrashing his Hand into the Fire;" "Marcus Curtius precipitating himself into the fiery Gulf;" and "The Punishment of Titus Manlius;" in the latter of which the artist has introduced the beheading machine, which is since known in France, the dreadful guillotine. A pair of "Sophonisba" and "Artemisia;" "The Supplication of Regulus;" "The Centaur Chiron instructing Achilles;" "The Triumph of Bacchus," a frieze in the antique style. A set of six emblematical triumphs of human nature, viz., Valour, Chastity, Love, Time, Death, and Religion. A set of five of the fences performed, with Latin inscriptions; another set of the seven liberal arts; and another of the seven mortal sins.

But his principal and largest work, of which we have already spoken, is "The Taking of Carthage by the Romans," after Titus Livius. Among that class of the ancient engravers of the continent who are called the "Little Masters," from the small dimensions of their works, Henry Aldegrever stands in the very first rank. He was born at Zoult in Westphalia, A. D. 1502, but of his ancestors we find no account. Both his baptismal and family names have been mistaken, for, by some authors, he is called Aldergrafi; while others, perhaps, mistaking some of the smaller works of Albert Altdorfer for his, lay that his Christian name was Albert; but professor Christ affirms his renders that the name of this artist was Henry, and not Albert; and upon his own portrait his surname is written, at full length, "Aldegrever."

Nuremberg was at that time the head-quarters of German art; and thither young Aldegrever was sent to study under Albert Durer. He imitated the style of his master with great success, and gradually learned to blend with it a certain small portion of the elegance and simplicity which Italy first caught from the resurrection of Greek art, and Germany from the engravings which were brought thither from Italy. Aldegrever's object, which receives the first family, is a set of a riting form, and it is generally allowed by his critics, that had he resided in Italy, "the genius and ability which displayed itself so conspicuously in his own country, would have shone with double lustre." The manual part of his engraving, executed entirely with the graver, is extremely neat, and in a style evidently founded upon that of Durer. He is among the first who gave texture to the light parts of flesh by the admixture of small long dots, which has since been carried to such admirable perfection by Nanteuil and others. His drawing of the naked, which he seems fond of introducing, is more correct than is found among his predecessors of Germany; and his men more correct than his women. His heads are, in general, expressive, and his other extremities well marked, though occasionally somewhat heavy.

The time of the decease of Aldegrever is not accurately known, but the latest of his prints is dated in the year 1558. The Abbé Marolles has seen at least three hundred and fifty different prints from his graver, of which the following list contains the name of the principal; but the great demand for his works has occasioned his plates to be much worn, and often re-touched; and Strutt, with becoming fidelity for his fame, advises the collector to be circumspect as to the impressions he admits into his port-folios. His monograms may be seen in our plates of those of the German school.

The principal portraits of Aldegrever, are those of himself, without a beard, aged 28, and dated 1530. Another of himself, aged 35, in which he appears with a long beard; Martin Luther, dated 1540; Philip Melancthon, of the same age; and Albert Vander Helle, aged 28, and dated 1538; all in quarto.

His folio portraits are those of William dux de Julius; John of Leyden, king of the Anabaptists, and Bernard Knipperdolling, another fanatic.

Of his historical engravings, the most celebrated are, A set of six, from the History of Adam and Eve, dated 1540. A set of four, from the History of Lot, dated 1555. A set of four, from the History of the patriarch Joseph, dated 1528 and 1532; all in 12mo.


The only etching from the hand of Aldegrever is now become very scarce; its subject is Orpheus and Euridice, dated in 1528, and in 12mo.

James, or Jacob Bineck, was also of Nuremberg, or, according to some authors, was born at Cologne, in the year 1506, and died at Rome in 1560. His style of engraving greatly resembles that of Aldegrever, under whom, or Albert Durer, he probably learned the rudiments of his art, and improved himself afterward in the school of Marc Antonio; yet his style is not always the same; it often pollides more feeling facility than that of Aldegrever, and when, at the best, more of Italian taste. He appears generally full, and imitated, that of Marc de Ravenna.

His cypher, composed of the initial letters of his name, is of the same kind as that of many other artists who lived about the same period; but he sometimes added a little bird, and at others used the monogram, which will be found on our second plate.

The chief works of Jacob Bineck are, "A Young Man drest in a Broome, holding a Skull under his Cloke, and a Cup in his Right-Hand." This, according to Sandrart, is his own portrait; but, though the face may possibly resemble him, the rest of the composition is copied from an engraving of the same size by Israel von Mechenin.

The portraits of Francis I., Christiannus II., surrounded by ornamental architecture; a young prince, dated 1526; Luke Gaftos, dated 1529; the archdukes of Elizabeth of Denmark; and of Martin Luther, inscribed "In filentio Veifra, and Philip Melancthon, inscribed "Si Deus pro nobis quis contra nos."

His principal historical engravings are a small plate of St. Jerome. "Marcus Curtius precipitating himself into the Fiery Gulf," marked 15 I. b. 29. A pair, of the frieze proportions, of "Infant Bacchanales gathering grapes, &c." and "The Triumph of Bacchus," wherein his car is drawn by satyrs, and attendant nymphs are playing an musical
Seven engraving a the Nurember," which is deduced from Bihlaid Pirkheimer's emblems, are Experience, Envy, Tribulation, and Intolerance, marked 15 L. B. 29. "History," a female figure with wings, writing. A pair of "Peafants marketing with People of Superior Condition." A set of twenty, of Divinities standing in Niches, copied from Curaticus, who copied them from Rosso.

The above are marked with the initials of the artist: the following are with his monogram. A pair, very small, of "Eve with Two Apples, and Adam holding the Branch of a Tree." "Lot and his Daughters," a small circle. "David with the Head of Goliah;" and "Judith with that of Holofernes," both small. "The Millennium, or Archangel Michael, chaining the Devil." "The Holy Family," "The Slaughter of the Innocents," a very rare print, after Raphael, but perhaps copied from the engraving by Marc Antonio. The Defeat of the Crofs," St. John asleep with the Lamb," dated 1526. "St. George and the Dragon." "Mercury travelling in a Defart," a small circle. "A Soldier defending himself against Death, who has overthrown him." "A Woman beating the Devil with a Distaff." "A Woman advancing with Surplice towards a Man who is seated near a Pedestal, on which is a Child," after Raphael, and engraved under the direction of Marc Antonio. "A Male and Female Peafant Dancing." "The Blind Child." A vignette, with Cupids mounted on dolphins.

Strutt begs leave to add, a figure of "Saturn flanding in a Niche devouring One of his Children," a small upright, which differs in the Ryle of engraving from the foregoing, being more bold, spirited, and correct. The real meaning of this allegory must be, that Time is swallowed up by Eternity. On a tablet which is introduced is "Jacobus Bisck Colomicis, fecit 1530.

Another of "the little makers" of Germany was Hans or John Brofamer, born at Fulda, in the circle of the Upper Rhine, in the year 1566. His manner of engraving offers peculiar refinement, but the school on which he studied is not known; sometimes, however, he differs from that distinguished master by interworking the lines of his draperies and backgrounds with rippling. His drawing of the naked is however very deficient, and in manual execution he by no means equalled the Behams. He died at the age of fifty-four, and his cypher, composed of the letters B and S, will be found in our first plate of those of the German school.

His principal engravings are, the portraits of Martin Luther, and the abbot of Fulda, dated in 1531.

And in history, "Samson and Dalilah;" "David and Bathsheba;" and "Solomon's Idolatry," dated 1543, all small uprights. "Xantippe and Sostratus;" "Laococon and his Sons;" dated 1535; "The Rape of Helen;" of the frieze form, dated 1540; "Marcus Curtius leaping into the Gulf;" a small circular plate; "The Judgment of Paris;" "A Crucifixion, with Angels, the Virgin Mary, and St. John;" "The grand procession of ChristiaW Heroes;" a rare print, engraved on wood, and sometimes attributed to Bargmair; and "Biblia a Vos Testamentis artificialn picta allegorica," printed at Frankfort in the year 1552, and consisting of a set of engravings on wood, chiefly, but not entirely, copied from those of Holbein, which were published at Leyden in 1547; but by no means equal to the originals, either in spirit, neatness, or trut

Augustin Hirchfogel was born at Nuremberg A.D. 1506, and died in the fame city in 1560. He was probably educated a painter, but produced several etchings, of which the landscapes possess considerable merit, being etched with some taste and the touch of a master, but when he introduced the human figure it is very ineptly drawn. The singular monogram of Hirchfogel, surmounted by a little cross, will be found in our first plate of those of the German school, and his principal productions are as follow: Part of "Raphael's slaughter of the Innocents," from a sketch by that master, which differs from the print by Marc Antonio, dated 1535. A set of four, and another set of six landscapes, from his own compositions of cattle and mountain scenery, in 4to., dated 1546. A folio landscape, in which is introduced an ill-drawn female intended for Cleopatra, dated 1547. An ornamented vase in 4to. dated the same year, and two small views of sea-ports, with flippings, &c. dated 1539.

Henry, whom Strutt has mistakenly confounded with Hans or John Lautenfack, was also of Nuremberg, or, according to some authors, was of Doppelmayr, and born in the same year with the preceding artist. He was the son of a painter, and learned the principles of design in his father's house, which he probably continued to inhabit, for we find that he died in his native city in the year 1529.

The elder Lautenfack employed much of his time in engraving on the precious metals for the sideboards and personal ornaments of the opulent and the great, but in the year 1567 he published at Frankfort on the Main the "Geometrical proportions and perspective of the Man and Horse," in small folio; "The Martyrdom of St. Catherine;" two ornamental plates of boys, &c.; "The decollation of St. John the Baptist;" "Christ expiring on the Cross," and a boy standing on a globe with a bow in his hand, and below whom is a deluge, with many small figures, are also engraved by Henry Lautenfack, whose marks will be found in our second plate of German monograms.

Of the fame place and family with the preceding, was Hans Sebald Lautenfack, who was born in the year 1568, but of the principal events of whose life, and the time of his death, we are ignorant.

His portraits are held in esteem among connoisseurs for their truth of resemblance; and his landscapes, which are characterized for their wild, or beautiful, or grand effects; but the figures which he has introduced are generally disproportionate.

His landscapes are of an historical character, and are commonly denominated after the figures they contain. Of these the following will probably be found most worthy of the collector's attention: "The little David battling the Great Goliah," dated 1551. "The Blind Man of Jericho, referred by our Saviour," and another miracle of "The Devil cast out from the Camaanite," both dated 1559. "Balaam and his Afs," in a very mountainous landscape, and a very rich scene of "The Labours of the Vintage," are also dated in 1559, all of the folio size. An upright landscape with a large farm, dated 1551. A pair of interesting and extensive scenes in 4to. dated 1553 and 1555. A grand tournament, of large folio dimensions, entitled "Equefris pedestrifric pugnaeicon," 1560; and another grand joust, entitled "Secundum Ciricenuim Ladorum, equidem certamen continens," 1560, both of which are now become very rare. A pair of views of the imperial city of Nuremberg, in large folio, each engraved on three plates, and dated 1572 and 1555.

The principal portraits by Hans Sebald, are those of his father Paul Lautenfack, painter of Nuremberg, in folio. Himself, in small folio, dated 1552. Hieronymus Swerflab. Georgius
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Georgius Roggenbach, and two other half-lengths, all in folio.

The brothers David, Jerome, and Lambert Hopfer appear to have been the sons of a goldsmith, and flourished at Nuremberg within the first fifty years of the sixteenth century. They produced a great many spirited etchings, which Hollart afterwards made the foundation of his style. David was the most industrious of the three, but defaced in the vicious taste of his age and country: yet his freedom of handling is very pleasing, and displays itself to advantage in buildings and ornaments. He usually marked his plates with the initials of his name, between which he introduced what the Abbé Marolles appears to have mistaken for a candlestick; for he emphatically calls the Hopfers "les Maîtres du Chandelier," but what is really intended for a hop-plant, in allusion to their name, which in the German language signifies hop-plant. These letters, with the plant, sometimes appear on a tablet, for which see our plate of German monograms.


Jerome Hopfer etched much in the same style with his brother, but was somewhat inferior in merit. He made several copies from celebrated works of Albert Durer, and sometimes engraved from his own compositions, marking his prints as did his brother.

His best works after Durer are, "St. Hubert," "St. Jerome," and "The Grand Cannon." "Hercules Battling the Hydra," is from Andrea Mantegna; and the belt from his own design are "Lucina holding a Moon in her right Hand, and a Palm branch in her left." "Minerva holding a small Figure of Victory." A rare print of "The English and French drawn up in battle array, previous to the Fight at Agincourt." And a battle, after Julio Romano.

Of all his merit than his brethren, was Lambert Hopfer, who copied in etching a great number of the works of Durer, but his works display little talent and lees correctness. Among them are a set of fifteen of "The Life and Passion of Christ," "The Conversion of St. Paul," "The Fall of our First Parents." Several plates of arabesque ornaments, and four beautiful candelabra, with an arabesque band which is esteemed the best of his engravings.

Strutt has added to these another Hopfer, for whom he claims equal merit with the poet. The initial letter of his christen name was an N. He worked with the graver, but imparted to his lines somewhat of the roughness of etching, and drew more correctly than David or any other of the family. To this artist he affixes "The Call of Jeremiah," a small upright, dated 1575. "A female Nude, holding a Palm Branch, and several Figures sleeping with the holy appearing above," which, he says, is a fine spirited etching.

David Funck, a printer of Nuremberg, towards the beginning of the last century, collected and published all the plates of these artists, amounting to two hundred and thirty, under the title of "Opera Hopferiana!" some of which were found to be executed on plates of iron or tin.

Virgile Solis engraved both on copper and on wood, chiefly from his own designs; was born at Nuremberg in the year 1514, and died in the same city in 1570. Under what name he studied does not appear. His early works resemble those of Beham, but when he came to engrave after Raphael, and other Italian masters, he adopted a style more open and spirited. His prints on wood bear great resemblance to those of Joft Ammon, both in design and execution.

Virgile Solis was a man of ability. His compositions are often judicious, but his drawing of the naked is not equally correct. He is chiefly among the little masters, and used occasionally three cyphers, which will be found in our second plate of the monograms of the German engravers.

Mr. Evelyn says, that for "imitating the style and figures of Aretilin, he had his eyes put out by the sentence of the magistrate." Strutt pretends, that if this story be true, the engravings of Solis must have been copies from those which Marc Antonio did after the design of Julio Romano, (and which he says are still of him his life,) to which the poet Aretin did but supply vermes.

The engravings of Solis amount to upwards of eight hundred, of which it may suffice to specify the following: "The Marriage of Cupid and Psyche;" "The Assembly of the Gods;" and "Mount Parnassus," all after Raphael. "The Bath of the Amabaptists," a small plate, after Aldegrever. A set of four plates of fragments of ancient architecture. A set of six heads of Roman emperors, small. A pair of small fizes, in which are numerous parrots. A set of portraits of the kings of France, from Pharamond to Henry III. The above are on copper, with some few etchings, which are inferior to the rest of his works.

His principal engravings on wood, are a set of one hundred and seventy from Ovid's Metamorphoses, small, and dated 1563. A set for the emblems of Nicolas Reusner, dated 1581. And, another set for those of Andrea Aretinus, both of which books were printed at Frankfurt in the year 1581.

Melchior Lorch, or Lorich, was born at Flensburg, in the duchy of Slefwic, in the year 1527, and died at Rome in 1586. He was distinguished both as an artist and an antiquary: some time about the middle period of his life, he made a voyage to Constantinople, where he painted and engraved the portraits of the grand seignior and his favourite, which are now become very rare, and where he formed that collection of Turkish drestes, which were afterwards engraved on wood, and published in the year 1576, in a folio volume. His engravings are decidedly those of a man of talent; he drew with considerable spirit, and a tolerable degree of correctness. His works on wood are executed with much freedom and boldness, while in those on copper their qualities
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Qualities are in some degree lost in the neatness to which he laboured his finishing. Strutt speaks of a crucified figure, (which is designed so much in the style of Michael Angelo, that he supposes it to be engraved after some work of that great master) as a very extraordinary production. It is executed entirely with the graver, and the left leg and arms are much fore-shortened. He says, "if this figure be not quite correct in all its parts, it is however well drawn upon the whole, notwithstanding the difficulty of the fore-shortenings, and is finished in a style of neatness equal to that of Jerome or Anthony Wieris, while it is superior to them in point of taste." His monograms, which he sometimes surmounted by the date of his work, will be found in our second plate of those of the German school.

The works of Lorioch, which are held in most request among connoisseurs, are: the portrait of Martin Luther, dated 1548. That of Albert Durer, with four Latin verses, dated 1559; a very rare print, done after a statue of a Cameo, and those which were mentioned above of the grand figurer and his favourite sultana, very neatly executed on copper, and very scarce. Ariosto, the Stagyrite, dated 1561. "St. Jerome in the Dafart," dated 1576; and a small upright of a female head, beautifully executed, are also on copper.

His best engravings on wood, are a feat mentioned above, of the costume of Turkey, in small folio, dated from 1570 to 1581. "The Tiburtine Sybil," dated 1574, executed in his best style. "A Woman prevailing her Breech, with numerous Animals below," and inscribed "Ops Saturni conjux materque Deorum," a very spirited engraving in folio, dated 1575. And "The Deluge," a large folio, engraved on two blocks, the impressions from which are afterward pasted together.

Theodore de Bry, or de Brie, the elder, was born at Liege in the year 1528, and died at Frankfort on the Maine in 1598; at which latter place he chiefly resided, but to whom he owed his early initiation to art is not known. He appears to have formed his taste by copying the work of Sebastian Beham. He worked almost wholly with the graver, and acquired a very fine style, which was well adapted to small folio prints, in which numerous figures were required to be introduced, such as fates, and funeral, processions. He drew correctly: his heads in general are spirited and expressive, and his other extremities well marked, and his back grounds, though frequently light, are touched with a masterly hand.

About twenty years before his death he visited England, and engraved at least two large and laborious plates, of which we shall presently speak, in the city of London. He died, as his sons in the 3d part of Boiffard's collection of portraits inform us, March 27, 1598. De Brie marked his plates with the cypher T. B. F. and at other times with that of Rene Boivin; and his principal engravings are those which follow: an etching of "St. John in the Dafart," a rare print. A pair of "The Fountain of Youth," and the "Little Village Fair," copied from Sebastian Beham. A "Bacchusian Procession," from Julio Romano. Three mixtures of the grotesque with theorkspherical and the circular. The Golden Age, a small circle, after Abraham Bloemaert. A pair of portraits en medallion, of Scanderbeg and Donze his wife. A set of nine figures of the muses, in folio. The plates for the four first volumes of Boiffard's Roman Antiquities (of which the two last volumes were completed by the sons of our artist). The plates of the manners and customs of the Virginians, published in "The brief true Report of the New-Foundland of Virginia. by Thomas Harret, servant to Sir Walter Raleigh," from drawings by J. White, printed at Frankfort by J. Wechelius, A. D. 1598, which were afterwards copied by Picart, for his "Religious Ceremonies, &c." The plates to the Latin narrative of Spanish cruelties in America, published 1598.

His largest work appeared in the same year, and is entitled "Decriptio Indie Orientalis et Occidentalis," in nineteen tracts, which are contained in fivefolio volumes.

De Brie is also the author of a work which may be thought still more interesting to British feelings, because connected with British history. It is the procession of the knights of the garter in the 18th year of the reign of Elizabeth, of which Strutt gives a very particular description: "The procession is represented as moving along a portico quite open on the side next the observer, but supported by thirty-three pillars of the Ionic order, on the side from him. Over each knight companion of the order are his arms, intersected with the garter, and, in a compartment below, his name, titles, &c. are written in French. The last ball was vacant, and there is only a fancy portrait given, without name or arms. There are sixty portraits in the procession, each of them between four and five inches in height! Under the arches of the portico is a delightful view of a hilly country, (too likely for an English prospect,) interspersed with castles, churches, hounes, rivers, woods, &c. and an exact view of Windsor castle as it appeared in that reign. The roll is sixteen feet three inches long, and was engraved on twelve plates."

Hollar to his plate of the procession, copied in small from this engraving, in Athanole's order of the garter, says, "the original was designed by Marc Garrerd, who could be then only fifteen years old." Wherefore Strutt concludes this to be a medall, but perhaps Garrerd made a reduced copy from this print, from which copy Hollars plate was engraven, which would reconcile the accounts; for Lord Oxford dates Garrerd's drawing in the year 1584, whereas De Brie's plate was finished in the year 1596; and Strutt, reasoning from the dedication being made in the name of Thomas Davies, Rouge-Crois, concludes that it was designed by him.

Strutt says he never heard of any other impressions from this plate than the proof, which, after belonging to the Norroy king at arms, came finally into the possession of John Fenn, esq. of Earl Durham in the county of Norfolk; but the engraving is mentioned by Huber, and pretensively therefore, is not unknown on the continent.

To this detailed account of this very curious historical engraving, Strutt adds the order of procession, and the names of the sixty portraits of the knights companions and officers of state; and the reader who wishes to be informed on these points, is therefore referred to his biographical dictionary.

The other plate which our artist is known to have engraved in London, is "The Funeral Procession of Sir Philip Sydney," on thirty-four plates, forming, when pasted together, a very long roll, but more frequently forming a book. In the inscription beneath, it is said to be "contrived and invented by Thomas Lant, gent. servant of the honourable knight, and graven on copper by Derick, or Theodore de Brie, in the city of London 1578;" and prefixed is the portrait of Mr. Lant, aged 32.

Jean Theodore de Brie the younger was the eldest son of Theodore, of whom we have just concluded our account. He was born at Liege in the year 1564, and died at Frankfort on the Maine in 1623.

The engravings of Jean Theodore are on the whole superior to those of his father both in taste and precision, and he assisted his father in the literary parts of those works in which
which he engaged, as well as in the engravings; but Jean
Israel, the second son of Theodore, who also assisted, and
succeeded him, was far less successful.

The brothers John, Theodore, and Israel, completed the
plates for Boiflard's Roman Antiquities, and added several
To the collection of portraits of illustrious personages,
which their father had begun to form.

Among other portraits, we find those of Gerard Mer-
cator the celebrated geographer, and Daniel Specklin,
both in 4to.

The bell historical works of Jean Theodore are, a set of
the elements, consisting of four plates in 4to. "The Return
of Rebecca," after Babtazar Peruzzi; "A March of Soldiers;
and 'A March of Soldiers conducting Prisoners," sometimes called "The Triumph of Death," both
of the frieze form, and by some supposed to be after Titian.
"The Village Fete," with a Latin inscription, after Sebald
Beutum, and "The Fountain of Youth," after the same,
both of the frieze form; and a set of twenty-four plates
Accordingly.

Jean Kebertaler was born at Dreiden in the year 1530;
under whom he studied is not known, but he continued en-
graving in his native city, until some time about the close
of the sixteenth century. He engraved some plates after Jean
Marie Noffen, who was sculptor and architect to the elector
of Saxony, of which the following are those of most im-
portance.

"Nimrod building the Tower of Babel;" "The De-
struction of the Babylonian Empire;" "The Empire of
Rome," in the back ground of which is the death of Cesar.
"The Empire of the Church," where the Pope is represented
receiving the homage of Charlemagne; and "An Allegory,
where a winged figure of Death, with two trumpets, is sup-
porting a globe, all of the 4to. viz.

Tobias Stimmer was born at Schaffhausen towards the
close of the sixteenth century, but resided chiefly at Straf-
burg, where he was patronized by the margrave of Baden,
and became both a painter and engraver of eminence. His
engravings are chiefly on wood, and from his own com-
positions; the engravings in the "Novae Tobiae Stimmeri
facrorum Fabricorum figure veritatis Latinis et Germanicis
exposita," are from compositions by Stimmer, though he
was assisted in the engraving by his brother Christopher,
and his pupil Christopher Maurer. Stimmer understood the
human figure very well, and composed with so much taste
and judgment, that Rubens has been heard to declare, that
he had studied Stimmer's bibles with attention and with
great benefit, and Sandart, who relates this anecdote, calls
the book, "A Treasury of Science for the art of Painting."

In the earlier part of his career, Stimmer was unfortunate,
and paft some of his best days in painting the façades of
houses at Frankfort on the Main, and at Strasbourg. But
let no man of talent, who poifees the means of fìewing his
talent, despair; it was the pleasure he received from some
of their, which accidentally caught his notice, that occa-
sioned the margrave to engage Stimmer in his service, and
began the foundation of his fortune. For him our artist
painted the history of his ancestors, and the margrave's own
portrait, and this day afferts the superior powers of Stimmer
in this department of art.

We have given his monograms in our second plate, and his
principal work, excepting his bible, is "The Annunciation,
in folio.

Jean Christopher Stimmer was born at Schaffhausen in the
year 1552, and died at Paris some time about the commence-
ment of the succeeding century. He was the brother and dif-
ciple of Tobias, and engraved on wood a great number of his
compositions with considerable success, for he drew with
ability, and hatched his engravings in a bold, but meadow style.

After the death of his brother, Christopher travelled to
Paris, where he performed some engravings, and was com-
monly known by the name of "the Switz," and where he
died, leaving behind him a son, who also engraved on wood a
considerable number of tablets after Francis Chauveau.

Christopher used the complicated cypher which will be
found among those of our monograms of the second plate of
the German school, and his best engravings are those which
follow:—A set for the New Testament, with the Apocalypse,
printed at Strasbourg in the year 1588. A collection of
portraits of the scholars and theologians of the German
nation, printed also at Strasbourg by Bernard Jobio, in 1591.
"Icones Alphabetiae," a collection of engravings printed in
the same year, all of the 4to. size; and a capital print of an his-
torical portrait of a kneeling figure, inscribed "Contrafaccio

Joel or Iodocus Ammon or Ammon, designer and engraver
on wood and on copper, was born at Zurich in 1539, and
died at Nuremberg in 1591. Not meeting with encourage-
ment in his youth at Zurich, he travelled to Nuremberg, a
City where the arts were reported to be in a flourishing state,
the year he became of age, and in 1577 renounced the
rights of a citizen of Zurich, in order the more firmly to at-
tach himself to his adopted country. Strutt says of him,
that if patience and affinity of themselves could constitute
an artist, Ammon would well deserve that character, from
the multitude of designs which he made, and the great number
of plates which he engraved, amounting, according to Huber,
to more than five hundred and fifty. But though a great genius
may be improved by cultivation, yet is equally certain that
neither pains nor study can create a great genius. Much
merit, however, was certainly possessed by our artist; who
lived at a time when almost every book which appeared was
ornamented with prints, and was employed by most of the
great bookfellers, especially Siegmund Feyerabandt of Frank-
fort.

The engravings of Joel Ammon upon copper are not
equal to those which he performed for the letter press. His
invention was not very copious; his figures are tolerably
proportioned, and the detail of his drawing is careful and
moderately correct; animals in particular he touched with
great spirit. His style of engraving is neat and decided,
but his lines are more regular, they are less free than those of many of his predecessors. He affixed various marks
to his performances, as may be seen in our second plate of
the monograms, &c. of the German school of engraving.

His principal works on copper are, a set of twelve illu-
trious women, beginning with Eve, under the title of "Eva
die Gebrerin;" a set of figures of warriors, small uprights,
marked Joel Ammon inventor 1590; the set consists of eight,
and there is a set of eight others, fighting with swords and
shields. The four scions, and the four elements, dated
1569. A set of the twelve months, perforated, and a set of
fifteen friezes of hunting subjects; a considerable number of
etchings of subjects of piety, after Winckelhaus Jamitzer;
the bombardment of a city, dated 1570, in folio, and the
portrait of Carparis de Cenigoun, D. Calliostro, marked
Joel Ammon Figurarius, 1573.

His best engravings on wood are, "The Creation of
Man;" "The Diet of the Empire," both in folio, the
latter an oval. "The Marriage at Cana," in quarto; a set
of one hundred and fifteen, entitled, "De omnium libera-
liquin mechanicarum et fidementarium artium genera con-
tinentes, &c. Edit. per Hoeltmann Scoperum Francof. 1564." This
work
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work consists of artists and artisans, represented in their respective employments: among them are some excellent figures, and in that which represents the engraver, Amman has given his own portrait. A second edition was printed A.D. 1574, and a third in 1588, but the first is now become very scarce. The book is a large octavo.

A set of one hundred and two, besides the portrait of Feyerabandt, for a Latin edition of Livy, printed at Frankfort A.D. 1572-3, in oblong quarto.

Another set for a folio edition of Pliny, printed also at Frankfurt A.D. 1584. Another set for a quarto book of hunting, printed at Frankfurt in 1582, which book was considerably augmented after the death of Amman, and reprinted in 1617. Another set of one hundred and three of ecclesiastical habits, dated 1565, and another of one hundred and fifty figures, for “Gynaecum, in Theatrum Mulerum, in quorum præcipuarum omnium per Europam, &c.” in oblong quarto, printed at Frankfurt, 1586.

Christopher Maurer engraved from his own compositions, and from those of T. Stimmer, both on copper and on wood. He was born at Zurich A.D. 1558, and died at Winterthur in 1614. His father Johann was an artist, and under the paternal roof he learned the rudiments of art, but was afterwards removed to Strasbourg, and placed under Tobias Stimmer, where both the master and scholar were close students, and soon began to be distinguished by the number of interesting and beautiful works which they produced.

The cypher of Maurer will be found in our second plate of German monograms. After plying some years in the school of Stimmer, he returned to his native city, and added to his reputation by his fresco pictures which adorn the façades of distinguished houses, and by the like likenesses he displayed in his portraits; with the true spirit of a Swiss artist, he always preferred patriotic subjects, and has often painted the origin of the Helvetic confederacy.

Of his engravings, those on copper are most sought after by connoisseurs, particularly a set of bible cuts, and four emblematical engravings relative to proceedings in the courts of law, after which, the death of the artist, were introduced into a Latin book.

Of his letter-press engravings, which are neatly executed, the belt are probably the set of animals of the chase, which he executed in conjunction with his master, and which were published at Strasbourg in the year 1605. And a set of the bible under the title of “Historische Vorstellungen über die ganze Bibel,” which do honour to his inventive talent, as well as to his manual powers as an engraver.

Christopher Janitzer, or Jamnitzer, was born at Nuremberg in the year 1568, and died in the same city in 1617. He performed several etchings which are marked with the cypher which the reader will find among our monograms of the German engravers, but they are far from being of first rate merit.

Of the same family were Bartholomew and Wenceslaus Jamnitzer, whom we pass as unimportant persons.

The bell was cast by Christopher, in which case, the bell of these groups are those which follow: A set of twelve, in 1570; another set of twelve, mounted on marine animals; another set of four combined with swans, flowers, &c.; four children dancing in an armour. A set of grotesque chimeras, in quarto; Christopher Jamnitzer also engraved a portrait of himself fitting in a perspective machine, in the act of drawing or inscribing.

Matthew Greuter was born at Strasbourg A.D. 1564. He travelled more than once to Lyons and Avignon, and from thence to Rome for professional improvement, in which latter city, in the year 1588, he died.

Strutt describes him as a man of genius, but so much praise as is implied in this work, cannot justly be allowed him. He worked partly from his own compositions, but his drawing is by no means correct; his extremities in particular are badly neglected. He sometimes executed his plates with the graver only, in a neat style, and in other instances has employed etching. His principal productions are, the portraits of the popes Innocent X., and Sixtus V.; the latter surrounded with an ornamental border in which the papal coinage is introduced. Cardinal Sarraphinus Olivarius Razzabul, all in quarto.

Of his historical works we shall only mention “The Virgin and Child,” feated in a landscape, after Barcecio. Mary Magdalene leaving her right hand upon a skull, after S. Gaetano, dated 1584; both in quarto. An emblematical print of Venus floating on a globe, with various virtues and vices personified, very neatly finished, and marked M. Greuter int. ex f. 1587, in small folio. “The Fall of Phaeton,” after Windel Dieterlin, in large folio, dated 1588. “The Destruction of Troy,” after Lanfranc, and the magnificent cavalcade of the emperor Charles V. engraved by Greuter in concert with Lucas Vorlcrman, a large print of the frieze form, engraved on several plates.

As Jean Frederic, the son of Matthew Greuter, was born at Rome, and lived and died in Italy, our account of him will be found under Italian School of Engravers.

Matthias Kager was born at Munich in the year 1566, and died at Augsburg in 1594. He studied in Italy, and before ranking high among the historical painters of his time, was an engraver of merit. His style is neat, and performed chiefly with the graver, though sometimes with the admixture of etching. His attachment to liberty, and aversion to the manners of a German court, induced him to quit that of Bavaria, and he became a citizen and finally a burgomaster of Augsburg.

S. Kilian engraved a portrait of him in 1626. The best of his own prints are: “The Adoration of the Shepherds,” dated 1610. “St. John Baptizing Christ in the river Jordan,” both of the folio size, and from compositions by himself: “The Holy Family,” in an oval, also from his own picture, and in 1580, and “St. Francis surrounded by the Monks of his Order, to whom Christ and the Virgin Mary are appearing in the Clouds,” a middling-sized upright from P. Remigius Bozzolo.

Of Adam Eiheimeir, furname Adam of Frankfort, who should else have been mentioned in this place, we have already spoken. See Eiheimeir.

Theodore Kruger, or Cruger, was born in the city of Munich A.D. 1576. He travelled to Italy for improvement, where he formed his style of engraving on that of Francisco Villamena. He handled the graver, which was the sole instrument of his art, with boldness, freedom, and facility, but his chiaroscuro is very defective, and his outlines incorrect and hard.

His principal engravings are: “The Life of St. John the Baptist,” on twelve upright folio plates, after Andrea del Sarto, with the portrait of the painter prefixed, and dedicated to Colme de Medici, dated 1618. “The Last Supper,” in large folio, after the same. “The Return of the Holy Family from Egypt,” where the infant is embracing Jesus Christ, after F. Bigio, also in folio. “The infant Saviour blessing the little St. John,” after the same painter. And “A Prince on a Tribunal, surrounded by divers Statesmen,” after Lanfranco, and inscribed “Vox mildi.”

Cruger has also engraved some portraits after Gabriel Wayer, to which he signed his name, which Cruger he is best known in Italy.

Theodore
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Theodore Cruger, the younger, was born in the year 1648, and was the son of the preceding artist. The Italians call him Della Croce, the Fleming's Verderuy, and the German Kruger. In the year 1710, he engraved, in concert with two others, the Flandern gallery. He also engraved "St. Francis at Prayer," after Carlo Maratti, and a couchant Venus, both in folio, beside several portraits, among which is the daughter of Georgione, after that master; and Ludovico Adimari, after P. Dandini.

Dominique Cuflos, otherwise called Baltos, was the son of Pierre Balshuir Balton, a painter and poet, who had some pretentions also to knowledge in the art of engraving. He was born some time after the year 1560 at Anvers, and died at Augsburg in 1612. His real family name appears to have been Baltons, but he settled at the birth named city, at an early age, under the name of Dominique Cuflos, and marrying there the widow of Barthelemy Kilian, the elder, was enabled to establish a lucrative print trade, which continued to flourish for a long period of time.

Cuflos had several daughters, of whom some were educated to the art of engraving, and proceeded tolerably well. He worked in a neat style, entirely with the graver, but his prints are laboured, tafleleaf, and without harmony of effect. Florent le Comte says he engraved portraits in the taste of Vandyke, but as Strutt properly remarks of this mistaken attention, there is not the least resemblance between the stiff portraits of Cuflos, and those so highly and so justly esteemed by Vandyke.

The principal engravings by this artist, are: the effigies of the German emperors, large whole length figures, in folio, dated 1593.

The portraits of the Fuggera family, of which the first edition, which is now become very rare, and is dated 1593, contains but sixty-four portraits: in the second the number of portraits is increased to sixty-seven: the third contains a hundred and twenty-seven, besides the arms of Fugger, and an ornamented title, but the names are added, of Lucas and Wolfgang Kilian. Another set of portraits of heroes, &c. entitled "Atrium Heroicum, Confarum, Regum, aliquumque famematum ac principium, &c."

The chief of his engravings of separate portraits are those of pope Sixtus V. prince Sigismund in the costume of Moliere, after J. Acha, and from the fame painter Marcus Bragadino, dated 1591. Christianus II. duke of Saxony, Henry bishop of Augsburg, (in an oval,) Johan Philipp, bishop of Bamberg, ditto. Maximillian, duke of Bavaria, and Elizabeth Lotharingia his wife, a pair of ovals, dated 1598, all of the folio dimensions.

The most esteemed of the historical works of this artist, are a set of "Female Saints," half lengths, after Frantz Alprenck. A set of four in folio, of "L'Histoire de l'Enfant prodigue," and "Judith beheading Holofernes," after John Van Asch, of the folio size.

Lucas Kilian, the patriarch of a numerous progeny of engravers, was born at Augsburg in the year 1579. Under whose direction he flailed, is not known, but the works of Henry Goltzius and Muller appear to have been his school. It appears, however, that he went to Italy, in order to complete his studies, where he engraved several plates from the pictures of the great Italian masters: but returned, and died in his native city in the year 1637.

"Few artists have manifested a greater command of the graver than Kilian: whether we consider the apparent facility with which his strokes are turned over each other, or the firmness with which they are executed, one cannot help admiring the artist, though it evidently strikes us that by paying too close attention to this part of his art, he neglected the correctness of his outlines, and fatigued the lights with unnecessary work." Such is the opinion of our countryman Strutt: to which should be added, that his drawing is not accurate, nor his chiaroscuro broad and impresive.

Of the numerous works of Kilian, the following are held in most esteem: "The Adoration of the Shepherds," a middling-sized plate, from the younger Palma. The same subject, a large upright, after Springer. Another of the same subject, after Rotenhauser. And another (a large upright) from T. Heinz. "A Holy Family," from Cornelius de Haerlem, and "The Miracle of the Loaves and Fishes," from the same master: both large uprights. "Christ Praying in the Garden," a small upright, placed at the top, from Frederic Sufties. "A dead Christ," from Michael Angulas. And "A Nymph and Satyr," from J. Heintz, both small uprights. "The Rape of Proserpine," a large folio plate, from the same master. "The Entombing of Christ," an upright, without the painter's name, dated 1665, which perhaps, with many other of the engravings of Lucas Kilian, is from his own design.

The best portraits by this master, are those of himself, aged 55, a rare print in 4to. "Petrus Cuflos, vulgo Balton, Pictor & Poeta Antwerpianus," dated 16.9 Nicholas Christopb, Prince of Rudzivil, both in 4to. The emperor Christianus II. dated 1615. Maria Eleonora Suverorn Gothorum Reginis. Guiflau Adolphus Suverorn Gothorum Rex. And Albert Durer, a half-length; all of the folio size: but whether the latter is from a picture by Rotenhauser, or after Albert Durer himself, the present writer is uncertain.

Wolfgang, the brother of Lucas Kilian, was also of Augsburg, and born in the year 1581. He studied under Dominique Cuflos, and, after his return from Italy to his brother Lucas, whose style he imitated without attaining to the same degree of excellence: his prints are somewhat water, but more stiff and formal.

Wolfgang employed the greater part of his time in engraving portraits, of which the following are those of most importance. Ernent Count Mansfeld. Maximilian of Walrlenflein, dated 1642. Jean Major, mathematician of Augsburg. Frederic Baron de Teufichan. Jean Goedefon, bishop of Wurzburg, and Ferdinand I. king of the Romans, all in 4to. Of the folio size: the archbishops of Mayence, Cologne, and Treves; his own portrait, inscribed "Labor improbus omnia vincit," and a set of twenty-seven of the emperors and archdukes of the house of Austur, from 1233 to 1623, with their lives and eulogiums, published at Augsburg, in 1629.

The most esteemed of his historical works, are the "Baptism of Jesus Christ," after Paolo Veronese. "The Assumption of the Virgin Mary," after Bentoreto. "The Descent from the Cross," after Paolo Farinato, and the "Good Samaritan," after Giacomo Bollino, all in folio. "The Resurreciton of Christ," after the copper after E. Baldino. The four Evangulists, in upright ovals, from his own design; and the "Festival of the Peace of Wolfbia," after Job Sandrart, in large folio, engraved on two plates, and which is now become a rare print.

Bartholomew Kilian, the third son of Wolfgang, was born at Augsburg in the year 1639, and died in the same city in the year 1696. He distinguished himself at a period of life so early, that Sandrart emphatically says, "he was born an artist." At the age of eighteen he engraved a Magdalene after M. Gondelach, which induced his father to place him under M. Merian of Frankfort, after studying with whom two years and a half, he travelled to Paris for further improvement. Here he remained more than three years, availing himself of the instructions of different artists, and

Returning to his native city, he continued to cultivate his art, and produced a great many excellent portraits, with some few historical subjects. Strutt is mistaken in saying he worked entirely with the graver, but is right in what he affords of the originality of Bartholomew's style. He worked in a manner entirely different from those of the Kilians, who had preceded him; sometimes, in order to make a striking distinction between the flesh and the draperies of his figures, he finished the former with dots only; and at other times expressed the darker shades of his flesh by lines, which he blended with dots in the lighter parts. Mariette and Barthelamy talk of him as an example for a painter, but these writers are warmer in his praise than an inspection of his work will fully warrant.

B. Kilian generally marked his engravings, of which the following list contains the principal, with his name at length, but sometimes used only his initials, and at others, according to Huber, a cypher which does not appear to belong to him, but which we have copied, with others of the Kilian family, in the second plate of our German monograms.

Six half portraits, in folio, of celebrated protestant preachers at Augsburg, after B. Kilian. Three medallions of archbishops of Salzburg, with allegorical accompaniments, after Henry Schoenfeldt. Johannes III. king of Poland, after Bloemart, dated 1681, a large bust of learned execution. Maximilian Emanuel, eldest prince of Bavaria, with historical accessories, a celebrated work, and the subject of a theft. The emperor Joseph as king of the Romans, on horseback, the subject of another academical thesis, dated 1694; which Huber pronounces one of the finest prints existing for natural grandeur; all these are in large folio. The portrait of Augustus II. Abbas Einfelden, is a large upright folio, dated 1686.

The bell historical production of Bartholomew is a "Madonna and Child," a beautiful engraving in large folio, after Calpar Sing.

Philippe Kilian was a younger brother of Bartholomew, imitated his style, and confined his talents almost entirely to portraits. He engraved, among many others, the portrait of his elder brother, whom he never equaled, though many of his works possess no small portion of merit.

Strutt mentions another engraving of his family, by the name of Wolfgang Philipp, who flourished in the next century, and who executed a great number of portraits, which however have too little merit for our particular notice.

Yet to show that nature had not exhausted the Kilian stock of talent, we shall here mention a little out of his chronological place, Philippe Andrea Kilian, great nephew of Bartholomew, who was born at Augsburg A.D. 1714, and died in that city in the year 1759.

Descended from a family of artists, he imbibed, in early life, what may perhaps be termed a hereditary taste for fine art. He first studied drawing and engraving under Frederic of Augsburg, and afterwards became the pupil of G. M. Priefer of Nuremberg, where he distinguished himself by engraving some plates for the "Physica Sacer. of Schenckel," and laid the foundation of his future fame.

Some years after, whilst engaged in engraving from the Dresden gallery, the reputation of our artist spread so high, that Augustus III. of Poland emphatically called him "the Magnet of Dresden," and when any other engraver produced an inferior plate from the collection, was said to say, in the way of delicate reproof, that it ought to be re-engraved by Kilian.

But our artist, notwithstanding these honours, felt too much restraint, whilst residing at the court of Dresden, or such passionate desire to return to his native city, that he sought an occasion to make such arrangements as enabled him to quit Bavaria after a residence of some years.

P. A. Kilian is usually reckoned among the most meritorious historical engravers of Germany. On a basis of sound drawing, he erected rather a singular style of execution; he interworked his principal or first course of lines with very delicate strokes, which he crossed with a course of lines exceedingly lozenge upon the first, and sometimes added a third course somewhat more square; at other times he interworked his shadows with long slender "peeks," as they are technically termed among engravers. But the characters of his heads are not equal to his general knowledge of the human figure.

His historical engravings are, "Jesu Christ at prayers in the Garden of Olives," an upright plate of the folio size, from a design of his own. "The Adoration of the Kings," after Paolo Veronese; "The Woman taken in Adultery," after Titoreto; and "The Family of a noble Venetian," after Paolo Veronese, are all large folio plates, executed for the Dresden gallery. "Mary Magdalene washing the Feet of Christ," is from Nicholas Graff; "The Baptism of Our Lord Auguifus," from J. B. Pittoni; and "Herodias with the Head of John the Baptist," from Carlo Dolce, are all of folio dimensions; "Regina Angelerum," where the Virgin appears surrounded by Angels in Glory, after Bergmuller, and another from the life of the Virgin, after C. T. Scheffier, are a large and highly esteemed pair of engravings. But perhaps his most justly celebrated work is a very large plate of "St. Cosmo and St. Damien," after J. Wolfgang Baunegaerter.

The bell portraits from the graver of Philippe Andrea, are those of Francis I. emperor of Germany, in a coat of armour, after Meitens. And Clemens Rezzonics Venetus, Pontiff Max, after G. D. Porta, a pair in large folio. Maria Therefa, queen of Austria, an upright folio. Johann Martin Christel, from a picture by P. A. Kilian, himself. Christoph Henry Andre Geret, after J. Romelli. Field marshall Curtisz Christophel Graf von Schieder, after Stranz. Ferdinand, duke of Brunswick, general in chief of the allied army, after Ant. Pefne; and Godofreus Schurhein, marked P. A. Kilian, p.m. et fepl. 1750, as one of the most dimensions.

George Christopher Kilian, another engraver of the same family, was living at Augsburg when Heineckin published his "Lide generale d'une Collection complete d'Eliampes," and perhaps may be living still.

Iface Major was born at Frankfurt on the Maine in the year 1578, and died in 1630. Discovering an early inclination for the arts of design, he was placed with Roland Savery, under whom he studied landscape painting for a time, but desirous of becoming an engraver, he placed himself, for instruction in that art, with Giles Sadler. He united etching with the work of the graver, but his works want energy, though they were held in some estimation at the time in which he lived. His principal productions are, a set of six middling sized landscapes, wild scenes in Bohemia, from Pietro Stephehi. A very large landscape from Rowland Savery, in which St. Jerome is introduced. Another set of eight mountainous and savage landscapes in Bohemia, in large folio, after J. H. Wolf, and an allegorical portrait of the Emperor in a car of triumph drawn by eagles and swans. Christopher Jegher was a justly celebrated engraver on wood, who was born some time about the year 1590, but the incidents of whose life are but little known. He established himself at Antwerp when he was about thirty years of age, where his extraordinary merit so strongly recommended
mended him to Rubens, that he was engaged by that great master to engrave; a considerable number of his compositions, and it is no small praise to add that he succeeded to the perfect satisfaction of the painter.

After the death of Rubens, Jegher re-purchased most of these engravings, and published them on his own account. Collection is held therefore bear in mind, that these impressions, from which the name of Rubens as the publisher is taken away, and that of Jegher substituted, are of the second edition, and consequently of inferior value to the first.

There is a degree of freedom and vigour in the style of Jegher that is perfectly homogeneous with that of Rubens; his hatchings are broad and powerful, and the imitation of the cross hatchings is so well expressed, that his best prints very much resemble drawings made with the pen and ink. He drew with masterly correctness; the extremities of his figures are very well marked; and his heads, though slight, are full of expression.

His best, and by far the greater of Jegher's productions, are after Rubens, but he has engraved a Crucifixion after F. Franck, which is dated 1637, and some few more from other masters.

The following are after P. P. Rubens: "Susannah surprised by the Elders," "A Repose in Egypt," both in large folio. Some of the latter are printed in chiaro-scuro, (i.e. with an additional colour to add the tints,) and are among the most scarce. "The infant Christ and St. John playing with a Lamb," "The Coronation of the Virgin Mary," and "The Temptation of Christ in the Desert," all middling-sized folios. "Hercules destroying Evny and Difcord," is from the ceiling at Whitehall. "The Conversation of Lovers," is a very large garden-scene, engraved on two blocks. "A drunken Silenus supported by Satyrs," is of the upright form, and a very fine composition of the manner, which was also engraved on copper by Bolfwerdt.

Matthew Merian, the elder, was born at Basle in the year 1593. His first studies were under the direction of Theodore Meyer, who instructed him in drawing. He afterwards became the disciple of Theodore de Brie. He was a man of talent, and his principal engravings are landscapes, which he etched in a light free style, and finished with the graver. His views have much of that rare but valuable topographical quality, the appearance of having been really copied from the places of which they bear the names, and which quality Merian had the skill in imparting to his disciple Wenceslaus Hollar, of whom we have given an account, in our Progress of English Engraving, but whose monograms will be found in our third plate of that of the German school.

Merian married the daughter of his tutor de Brie, by whom he had issue: he died in the year 1657, aged 88, at Frankfort, or, according to some of his biographers, at Schwabach.

His works, according to Le Compte, amount to upwards of five hundred plates. They are well known, and there is not so much disparity in their merits as to make a selection here either easy or necessary. His marks and monograms are five in number, as will be found in our third plate.

Of Matthew Merian the younger, who was for a short time in London, we have made slight mention in a former place.

His daughter, Maria Sybilla Merian, was a much more distinguished character. She was born at Frankfort on the Main in the year 1647. At the age of four years she lost her father, which in modern times is a great misfortune, but not for long, for her mother found in her second husband, Jacques Morell, a kind and indulgent protector, who suffered the infant genius of Maria.

Morell, as is well known, was a distinguished painter of fruits, flowers, and insects, and under his instruction our young artist soon distinguished herself as a painter and natural philosopher, to which attainments she afterwards added the art of etching.

In the year 1665 the married Jean André Graf, a meritorious painter of Nuremberg, who studied in the school of Morell. In 1679 she published the first volume of her "Histoire des Insectes de l'Europe définies d'après nature, et expliqués par Marie-Sybille Merian; où l'on traite de la génération et des différentes metamorphoses des insectes et des plantes dont ils se nourrissent;" and in 1683, she published the second volume of the same work, in the execution of which she paid attention to the engravings, as well as the designs, being the first work wherein is displayed the minuteness which is so important in the eye of the connoisseur, and she managed the etching-needle with the dexterity she had before evinced in the management of her pencil.

In the course of the next year, she returned to Frankfort with her family, and, from a mistaken zeal in religion, separated from her husband; retired with her mother and two daughters to Weil Frieland, and became a member of the society of Labadistes. The fraternal society of Labadistes, (who called themselves brothers and sisters) had then assembled at Peter Yrond, and their head-quarters were the castle of Dr. Boffe, situated between Franeker and Lauwerick, of which the poet's name was Sommerdick. Here she remained a considerable time, and here she had opportunity to inspect at leisure a fine collection of the insects of America, of which she made very exact drawings, and from hence her thirst after professional knowledge led her to make occasional excursions to Amsterdam and other parts of Holland, which at that time abounded with cabinets both of pictures and natural history.

Her enthusiasm now took a new turn, and coinciding with the wishes of the Dutch naturalists, she was induced, in the year 1699, to undertake a voyage to Surinam. On her arrival, after an agreeable passage, a wide field opened to her professional ambition. She painted the insects and reptiles of the country on vellum, and examined with philosophical care their various habits and changes; but the heat of the climate, and her intense application, having injured her health, it became necessary for her to return to Europe in the following year.

She brought home an ample collection, not only of drawing but of shells, dried insects, &c. She now settled at Amsterdam, and immediately set about publishing the fruits of a voyage, than which none had ever been performed more truly interesting to the naturalists of Europe.

Of the sixty large folio plates contained in her "Metamorphoses Insectorum Surinamensium, &c." several were executed by herself, and she also supplied the descriptions. It was published at Amsterdam in the year 1705.

In the second edition, which was published by the physician Jean Marret, in the French language, more plates and explanations were added by the author, who consecrated the remainder of her days to delineations and researches of this nature.

Too far advanced in life to venture on a second voyage, yet knowing that much had been left unaccomplished at Surinam, Maria Sybille now formed the design of sending thither her eldest daughter, who had accompanied and assisted her in her former voyage. Jeanne Helene cheerfully undertook the commission, landed at Surinam, painted with hereditary skill all the remaining subjects of natural history that she could find interesting in the country, added her remarks, and transmitted them to Amsterdam; but death had now intervened to prevent this consummation of the pleasures of Maria Sybille.
Sybille. The supplement was however published by her second daughter Dorothea Maria, who was born in 1678, and herself painted flowers and insects with great ability.

The curious, who would form an adequate idea of the knowledge and talent of this extraordinary artist, should visit the principal cabinets of Holland. Yet in our own national collection at the British museum are some volumes of her paintings on vellum, which are almost daily turned over with wonder by its numerous visitors.

John William Baker was a very meritorious painter and engraver of landscape and history. He was born at Strasbourg in the year 1620, studied under Frederic Brendel, and afterwards in Italy, where he resided a considerable time, and where he was patronized by the duke of Bracciano and prince Guelfianni. In the year 1672 he removed to Venice, and from thence to Vienna, and died there three years afterwards, at the age of forty.

The landscapes which he painted with watercolours on vellum are particularly celebrated, and he engraved a vast number of plates from his own designs, some of which are in a style resembling that of his contemporary Callot, to which he affixed the cypher which the reader will find in the third plate of our monograms, &c. of the German school of engravers.

Melchior Kaeffel compiled the volume of his works, which contains not less than five hundred engravings, after the death of Baur, whom he designs, in the language of Strutt, "in perfect marks of a superior genius, but without cultivation." The cypher with which he usually marked his engravings, of which the following are the names of the principal, will be found in our plate of monograms.

Portrait of Don Paolo Giodandino Ili; Orizio, duke de Bracciano, an oval, dated 1656, a rare print; a set of eighteen, of the costume of different nations; a set of fifteen of the battles of various nations, entitled "Capricci di vari biatelle," in quarto; another set of fourteen of battles; a set of eight landscapes, and another of four, entitled "The Elements." A set of twenty of a superior character, of the battles of "La Guerre Bismarck," and his principal work, consisting of one hundred and fifty plates in quarto, from Ovid's metamorphoses, published at Vienna in 1641. These are slightly etched, and finished with the graver. The figures introduced are generally small and incorrect in the drawing, the back-gounds rather dark, and the trees deficient in lightness and freedom. The architecture, which Baur is fond of introducing, is well designed, and correct in the perspective.

Hans or Jean Ulric Franck was a native of Kaufbeuren, an imperial city of Stamb, born in 1623, and was particularly excellent in painting and etching small figures. He settled at Augsburg, where he died in the year 1692.

In conjunction with Suan Sandrart, A. Zelt and J. Meyer, Franck engraved a set of the Fountains in Rome and its environs. The bell of his other engravings are four combats in quarto, dated 1641, "David and Abigail," and "Alexander defeating Darina," dated 1644, and both in folio.

Joachim Sandrart was born at Frankfurt on the Main in the year 1650, and began his career of art by studying under Theodor de Bue and Mathieu Merian, of whom we have spoken. At the age of fifteen he went on foot to Prague, to visit and obtain instruction from Giles Sachers, after which he placed himself under Gerard Houwhaert of Utrecht, to learn the principles of painting. In 1661, he travelled to England. He afterwards settled in Venice, Bologna, Naples, and Rome, and received instructions from Titian, Paul Veronese, Guido, Grandino, Poulin, and others; in short, if instruction and example alone could have produced a great artist, Joachim should have been the first of his time.

He returned however to Germany, and finally settled at Nuremberg, where he established an academy of art, and where he died ten years afterwards, at the age of 77.

Sandrart was rather an artist of acquirement than of genius, and hence his works are deficient in vividness and warmth. He painted and engraved history and portrait; he was also a man of letters, and his "Academy of Architecture, Sculpture and Painting," which was first published at Nuremberg in the year 1679, though prolix, is still celebrated through Europe.

This book, which contains much historical information, and the biography of the most distinguished artists, is enriched with a considerable number of engraved portraits, besides other prints. It was first published in the German language, but an edition in Latin was printed in the year 1683, and it has since received various additions from the successors of Joachim Sandrart.

His own engravings are performed chiefly with the point, and the bell of them will probably be found to be a half length figure of the goddes Flora, after Titian; an elderly woman contemplating a Cupid in no very delicate action; and "The Death of Cleopatra," from his own compositions, all in quarto.

Jacques Sandrart, the nephew of Joachim, was born at Frankfurt in the year 1650, and died at Nuremberg in 1708. He studied engraving at Amsterdam under Cornelius Dantker, and afterwards at Dantze under W. Hondsies.

He settled finally at Nuremberg, where he pursued his art with singular industry, the number of his portraits alone being not fewer than four hundred, some of them of the folio dimensions, and executed with the graver alone, in a clear and neat style, beside which he published a number of geographical charts and other engravings.

His portraits are not uncommon, and among the most meritorious will be found to be those of his uncle Joachim Sandrart, a half length figure, inscribed "Seculi Nominis Apelles." The busts of Rodolphus II., Ferdinand III., Ferdinand IV., and Federic, prince of Norwega and duke of Silesie; a half length of Hohannes Michael Dithers, after R. Wernfels; Ermuth Sophia, electoral princess of Saxony, &c. Johannes Paulus Auer, painter of Nuremberg; Joachim Sandrart, junior, dated 1688; all in folio.

Jean Jacques Sandrart, the son of Jacques, whom we have just dismissed, was born at Ratisbon A.D. 1655, and died at Nuremberg in 1698. He studied the arts of design under his father and his great uncle Joachim; he works the facility of his invention. He enriched the volumes of Joachim with several tasteful and spirited etchings, and his portraits, which are etched, and finished afterwards with the graver, are deftively held in esteem. His best works are the portraits of Elizabeth Henrietta, princes of Brandenburg, surrounded by emblems; and Sylvis Jacob de Gunckelmann, both in folio, after Adam le Clerc; "The Holy Family," after Joachim Sandrart; "Eneas saving his father from the Flames of Troy," after Raphael, dated 1682; "The Morphonie, or the Statue of the Rhine," among ruined edifices; "The Nile," among ruined monuments of antiquity, all in folio, and the latter pair, with many others after Joachim, are introduced into his "Academy, &c.,"

Jean Jacques also engraved several plates of merit for a folio work, entitled "Sculp Antiquae, Holieum.

Suan Marie Sandrart was the sister of Jean Jacques, and was educated under the direction of her father, and engraver with some ability a considerable number of plates of ornaments.

She engraved also a Bacchus, with the inscription "Im-

mode."

Of Hollar, who flourished about this time at Prague, we have already spoken. See Origin and Progress of English Engraving.

That extraordinary artist, Adrian van Ollade, for an account of whose merits as a painter, see the article Ostade, performed about this time some etchings, which are very fully admired for their freedom and spirit. They are not all executed in the same style, though the same mind be in every where evident. Some are dark and coarse, and were printed just as the aquafortis left them, while others are more neatly executed, and appear to have been subsequefly worked upon with the triangular point, as was the custom of Rembrandt and Worghile. The two marks with which Ollade occasionally subscrubbed his etchings, will be found in our third plate of the monograms of the German school.

The whole of his etchings consist of at least fifty-two plates of various dimensions, all from his own designs, of which the following are perhaps most worthy of being specified: "Several Peasants at the Door of a Cottage," with a fair in the back ground, a middling-sized upright. "A Dutch Wake," the same. "Several Peasants Fighting with Knives," a small plate, lengthways, dated 1658. "The Cottage Dinner," the same, dated 1653. All these in his bold style of etching. Those which follow are such as he finished with more care. "The Painter," with an inscription beginning in this manner: "Pictor Apelle, pingis," and the full impressions of this plate are with the cap considerably above the eyes of the figure; in the second impressions, the cap nearly touches the eyes. "A Mountebank," a small upright plate, arched at the top. "The Spectacle Seller," a small upright plate. "A Man, Woman, and Child, at the Door of a Cottage," a middling-sized plate, lengthways, dated 1652. Several peacants, half figures, at a window, one of them is fingering a ballad, and another holds the candle, a small upright plate. "A Man Leaning over a Platte, blowing a Horn," the same. "A Cottage Entertainment," with figures dancing, a middling-sized plate, lengthways.

The biographers of lieutenant-colonel de Siegen, (an officer in the service of the landgrave of Hesse,) have contended with the friends of the prince Rupert for the honour of the invention of mezzotint. The lieutenant-colonel was born in the year 1629, and, according to the baron Heinmack, executed in that manner a portrait of the princess Amelia Elizabeth of Hesse Calfis, in 1643.

For an account of prince Rupert's pretensions to the discovery, see the article Origin and Progress of English Engraving. "An Holy Family," after Caracci, in folio, is also mentioned (but without a date) as a mezzotinto production of Siegen.

Jean François Ermans, who possessed considerable talents in the art of painting and engraving landscapes and cattle, was born in the environs of Cologne in the year 1621, and died at Nuremberg in 1663. He studied under J. Holzmann and Jean Both, and the following plates, confiding chiefly of landscape scenery, adorned with ruined edifices and animals, were etched by him with great spirit and freedom. A pair of upright landscapes, "A Rocky Scene, and a Composition of Ancient Architecture," in 4to. "A Landscape," in which the figures introduced are a faun and bacchante. Another, with monuments of antiquity. And a pair of "Pastoral Scenes," with shepherds, cattle, and ruined edifices, all of the 4to size.

Matthew Keefell, or Kyfell, was born at Augsburg in 1624, and died there in the year 1682. He successfully mingled the work of the graver with that of the point, and his best prints, which are named in the following list, possess a large share of merit. The portraits of Christopber Benden, in 4to. Carolus Salzer. Adolphus Zobellus. Andreas Winkler Johannes Michael Dilherrus, after Ulricus Mayr (an highly finished head in an octagon border). Leonardus Weilins, after Jos. Wemers, all in folio. A set of forty-two after Ludovico Burnacini, entitled "Il Pome d'oro," and consisting of scene decorations, &c. dated 1668, are folio etchings; and the only historical work from his hand, with which we are acquainted, is "The Virgin and Child," apparently from a composition by himself.

Melchior Keefell, the brother of Matthew, was born at Augsburg in the year 1622, and died in the same city in 1683. Here he acquired the rudiments of his art, but perfected his studies under Merian of Frankfort, from whence, after residing some few years, he returned to Augsburg, and began to engrave the "Iconographia," of Wilhelm Baur, a folio work, which consists of one hundred and forty-eight prints of various sizes, consisting partly of the "Life and Miracles of Jesus Christ," and partly of views of the "Scenepots and Gardens of Italy," which work was published at Augsburg, A. D. 1682.

Quinn says of this artifit, that "there is something very agreeable in his manner of engraving, especially when he confined himself to subjects where the figures are small, for as he drew but incorrectly, his figures appear defective, as they increase in size." Baur was fond of ornamenting the back-grounds of his compositions with superb buildings, which Keefell has executed with much spirit; his rocks also, and mountainous distances, have great merit; but his trees want freedom, lightness, and characteristic determination of their foliage; his chiarofucro is also pretty and fascinating to the eye, if this be not rather the fault of Baur.

Melchior engraved other plates besides those for the Iconographia of Baur, of which the principal are, "The History of Ulysses," from Theodore van Talden; some antique statues, executed entirely with the graver; and the portraits of Sebastianus Kirchmeyers, public professor at Ratibon, after Benj. Block, in folio; Johannes Horius; Maximilanus Curz, dated 1658; and Antonius Schottius, dated 1680, all of the folio size.

Jeanne Sibelle Keefell, born at Augsburg in the year 1646, was the third daughter of Melchior, married Jean Ulrich Kraus, engraved, among other plates, a set of four, of the Satyr and Villagers, Juna, Venus, and Pallas, after Elihuem, and died in her native city in 1717.

Jonas Umbach was also of Augsburg, born in the year 1614, and merits an high rank among the artists of Germany. His prints conflict chiefly of etchings after his own designs, executed with spirit and an appearance of facility. He engraved one hundred and eleven plates, of which the following are the full-length figures of the principal, and died in his native city about the commencement of the seventeenth century. "A Madonna and Child." "An Holy Family." "A Penitent Magdalen," and "St. Peter," all of small dimensions. Four plates from "The Parable of the Good Samaritan." Four ditto of "Infatate Sports." A pair of "Triumphs of Marine Deities." "A Family of Satyrs," all of small sizes; and a set of four landscapes, adorned with ruins of ancient monuments and pastoral figures, dated 1678, in 4to highly esteemed engravings.
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Lingelbach, Backhuysen, and Jean Henry Roos, also performed some meritorious etchings in Germany about this time. The animals of the latter are much celebrated, and among his best plates may be reckoned a set of twelve, of "Domestic Animals," in 4to. A pair of "Grand Landscapes," adorned with castles and natural buildings, and "Un Berger endormi au pied, &c." He was born at Otterdorff, in the Palatinate, in 1731, and died at Frankfort in 1781, and his works were Julian Jaredye, and Adrian de Bie.

The family of the Wolfgangs contributed but little to the advancement of engraving; we therefore pass them briefly.

George Andrea Wolfgang was originally a goldsmith and engraver on the precious metals, but afterwards studied engraving on copper under Matthew Kachel, and produced some mezzotintos. He was born at Chemnitz, in Saxony, A. D. 1631, and died at Augsburg in 1716. The best engravings of George Andrea are the portraits of George Frederic, marquess of Brandenberg, after C. Zierl, in folio, and Pierre Muller, Jurconciflti, in 4to. And in history, "A Grand Sacrifice to Diana," after A. Schonsfeld, and "Saul confuting the Ghost of Samuel," after Jof. Werner, both of the folio size.

Andrea Matthew, the son of George Andrea Wolfgang, was born at Augsburg in the year 1662, and died in the fami-

city in 1733. He studied the elements of design under the direction of his father; but embarking for England with his brother, prefumptuously at some port in the Mediterranean sea, they were intercepted by an Algerine corsair, and carried into captivity. On their liberation, which was in consequence of a ransom paid by their father, they both returned to Augsburg, where Andrea Matthew settled, and began to engrave portraits: he also engraved a print of "The Court of Algiers," in which he has represented himself as a slave.

His best portraits are those of George Andre, his father, and Nicolaus Nuremberger, both in 4to., and in folio, John George Bittner, bishop of Frankfort, and Christopher Rad. In mezzotinto he has engraved Charles VI., king of the Romans. But, perhaps, his very best performance is a portrait of the margrave of Anfach.

His younger brother, Jean George Wolfgang, was born in 1664, received the same instructions as Andrea Matthew, and soon after their release from captivity travelled to Berlin, and in 1704 became engraver to the court. He engraved and published there a great number of portraits, among which that of the doctor Frederick William, after Jacob's equestrian statue in bronze, is deferredly held in most esteem, though, in most of his portraits, the flesh is executed with delicacy, and Jean George is, on the whole, as an artist, the flower of the Wolfgang family. He died at Berlin in the year 1704.

Guillauas Andrea Wolfgang was the son of Andrea Matthien. He was born at Augsburg in the year 1662, and, after studying portrait engraving and miniature painting under his father for a time, followed his uncle to Berlin, where he remained for many years, but returned finally to his native country, where he died in the year 1766.

His best portraits, of which the flesh is engraved chiefly in dots, are those of M. Francois Reyter, admiral pour l'Armee navale Anglois en Afrique. Wolfgangus Jacobus Sulzer, Reipublice Augul lance Decemvir, after G. Eichler, and Carl Freyher von Stien; in small folio.

Jean Jacques Thurneien, or Thourneyen, was born in the year 1636 at Bale, in Switzerland, and died in the same city in 1718. After having learned to draw in his own country, he went to Strasbourg to study engraving under Pierre Aubry, where he remained about three years, and removed successively to Lyons, and to the court of Turin.

In 1695, he returned to Vienna, accompanied by his sons; and his great merit, which was called by his rivals his superior fortune, obtained for him the patronage of the emperor Leopold. He was now the object of envy to the artists of Augsburg, where he continued to reside for some years; but as age approached, he wished to see again his native land, and departed for Bale in the year 1699, where, as we have already said, he finished his career.

Thourneyen was a man of a robust frame, vigorous mental powers, and extreme professional affability. His monogram will be found in our third plate of those of the German school. Among the engravings he performed, those which are executed with a single stroke or spiral, in imitation of Melan, have been most admired, though, perhaps, not most justly. He also occasionally imitated the square croffings of F. de Pouilly.

His son, Jean Jacques the younger, worked in imitation of his father, but was less successful. The best engravings by Thourneyen the elder are, the portraits of Laurentius Scutus, after Luca Diamante, dated 1661, Francois Turin, after P. H. F. van der Heyden, professor in the academy of Bale, after L. F. Wettelin, engraved of the folio size, (by the Thourneyen, father and fon,) in 1702.

Of his historical works, our allotted space only allows us to mention "The Virgin Mary, Infant Christ, and St. John," in a circle, after Carl Dauphin, a folio plate, engraved in the fashionable style of Mellan. "An Infant Christ," after Blanchet, in 4to. "La Balianca del Boccabini." Two large folio plates of "Grand Theses in Philosophy," in which whole length portraits of the princes palatine of Neubourg are introduced, and the statues of Laocoon, Antinous, and Latona, in the style of Mellan, for Sandrart's academy.

Francois Ertinger was born at Wyl, in Suabia, A. D. 1640, travelled to Italy for improvement, but died at Paris in the year 1700. As an engraver, neither his judgment nor his taste ranks very high; but the following list of his best works will shew that the subjects of his prints at least were sometimes wisely chosen. A set of eight plates after Rubens, from the History of Achilles. "The Marriage of Can in Galilee," a large folio, after Raymond le Fagi. A set of ten, from the same master of the History of the Counts of Tholoufou.

A large folio, of a Bacchanalian subject after N. Poullin; and the portraits of Nicholas Machiavel of Florence, the celebrated political philosopher, in 8vo. Gabriel de Pinaco, Jurconciflti; and Jean Ferdinand de Beughem, bishop of Anvers, after F. de Cock; both in folio.

Gerard Lairesse was born at Liege in the year 1641, and died at Amsterdam in 1711. He was instructed by his father, Regnier, in the rudiments of art. For an account of his merit as a painter, see the article Lairesse. He etched a vast number of plates, from his own compositions with great freedom, and the feafirs hand of a painter who has other objects in view than the graces or blandishments of manual execution. His chiaro-fcuro is broad and powerful, and so contrived as to conduct the eye of a spectator at once to the principal objects in the composition.

The major part of his designs were engraved by himself, and, as Bajan obfervers, are highly esteemed by connoisseurs, and exceedingly useful to students in art.

The portrait of Lairesse, in folio, surrounded by emblematical ornaments, has been engraved by N. Viflicher.

The most esteemed of his own engravings are, "The Sin of our first Parents," and "Adam and Eve expelled from Paradise," a pair in folio. A rich composition of "Joseph
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*Jocoph and his Brithren,* and another from the History of Solomon, both in large folio. *The Incredulity of St. Thomas;* and another in folio, from the Life of Christ, inscribed *Sapientia uigena Dei Maximus.* *St. Theretif in Extacy,* a large folio. *The parting of Hector and Andromache,* in folio. A rich composition of Marc Antony and Cleopatra, with the motto *quam Mars nungnum, visit Venus.* A march of Amazons, inscribed *Virtus viri computa actionibus probat.* A grand Bacchanalian subject. *Venus lamenting Adonis.* A set of four plates of the leasons. *Diana and Endymion.* *Bacchus Silenus and Nymphs,* all of the folio dimensions; and three large allegorical subjects, in compliment to the prince of Orange.

The prints of Lairesse are generally inscribed with one or other of the four monograms which the reader will find in our third plate of those of the German engravers.

Samuel Betschold was born at Sangerhaufen, in Thueringia, A. D. 1640, and died at Dresden in 1707. He was an artist of taste; and, being possessed of elevated habits of thinking on professional subjects, he was appointed director of the Dresden academy, and inspector of the electoral gallery. His excellence in fresco painting is attested by his picture of *The Defeant from the Crofs,* in the church of St. Martin at Halberstadt, and by several paintings which adorn theackle gardens near Dresden; and his etchings are performed with much picturesque freedom; the general character of his art partaking much more of the grand than the graceful. His principal engravings are, *The Army of Sennacherib defeated by the exterminating Angel,* in folio. A set of four, entitled *Le Don de l'Entendement!* *Le Don de la Science!* *Le Don de la Sagele!* *Le Don de la Force;* in 4to. A set of four parts of the day, with Latin infiripitions. A pair of emblematical subjects, entitled *La Poit et la Patience!* *La Foit! et la Charité!* ovals, in 4to. *Ulystes and Epius,* and a subject from the Life of St. Luke, both of the folio size.

Elias Hainzelman was born at Augsburg in the year 1649, and died in the same city in 1693. He studied engraving at Paris in the school of François de Polly, whose style of manual execution he imitated with great success; and Strutt has well observed, that had his drawing been equally correct, his works would have ranked with those of the greatest masters. They possess, however, especially his portraits, a considerable share of merit.

From Hainzelmann's historical works, the following will probably be found most worthy of felection: *The Silence,* after Annibal Caracci; *so called, because, while the Infant Christ is sleeping, the Madonna holds up her finger to St. John, as he approaches, to prevent his disturbing the Savioir.* This picture has since been engraved by others, but particularly by Bartolozzi in a very superior style. A large upright plate of an Holy Family, after Sebastiano Bourdon; and two others lengthways, of the same subject, from the same painter, in one of which the infant St. John presents a lamb, and in the other an apple, to Jesus Christ. St. Francis, after Domichino. *The tiles nee tangere,* or Christ in the garden, approached by Mary Magdalen, after Albano. *The Madonna and Child,* after Raphael. *Jesu Amabiles,* Mater Amabilis; St. Regard; all of the folio size.

His best portraits are those of Francis Zavier, of the fraternity of Jefuits; George Philip Rifs, after Ulric Mayr; Marcus Haberns, and Juliana Benedicta Winklerin, after the same. David Thomas ab Hagelstein, after de Neve. Agnes van Schoeneberg; Godfreed Eggerus; Gabriel Willer; John Jacob Haller, after D. Sivey, all in folio, and Johann Christolph. ab Adelmansfelden, after C. C. Kretzschmann, in very large folio; the heart, the size of real life.

Jean Ulric Kraus, or Krausse, was born at Augsburg A.D. 1645, and died in the same city in 1719. He was the disciple of Melchior Kuffel, and married Jean Sybille his daughter, and became a close imitator of the works of his contemporary Le Clerc. But all followers are necessarily behind. Though Kraus copied Le Clerc's Life of Christ, (which consists of sixty subjects) it is sufficiently obvious that they are but copies.

His engravings are numerous, chiefly from his own compositions, and the subjects of them, for the most part, views of buildings, or taken from the Old and New Testaments. In imitation of his model Le Clerc, he generally introduced a vast multitude of figures into his compositions, but they are all graceful, and for the most part well drawn. He frequently enriched his back grounds with architecture, which he appears to have well understood, and his chiaro-recto is often judiciously disposed, and his general effects good.

The cypher with which Kraus usually marked his prints will be found in our third plate of German monograms, and the list of his principal works is as follows: a set of sixty subjects copied from Le Clerc's Life of Christ, on small folio plates, two subjects on each, printed at Augsburg 1705. The history of the Old and New Testaments, in 4to, containing four small subjects on each plate, and apparently designed to be bound in 8vo. so as to have two subjects only on a leaf. The number of leaves would then amount to one hundred and eighty-eight, and they are so numbered. The four feasons, and the four elements, designed for the royal tapestries. A set of twelve interesting views of the city of Nuremberg, after Andrea Graf, in folio, and a very large and capital view of St. Peter's church at Rome, after the same master.

Carl Gustave d'Amingl, or ab Ambling, was born at Nuremberg A.D. 1651, and died at Munich in the year 1702. He studied under F. de Polly at Paris, and imitated his style, but with no very great success. He was a painter as well as an engraver, but was chiefly engaged in engraving portraits. When he attempted history, neither his drawing of the naked, nor the expression of his heads is correct, and the general appearance of his prints is cold and metallic.

Yet the race is not always to the swift, nor the battle to the strong, and Ambling, notwithstanding these defects, obtained court patronage, and became engraver to the duke of Bavaria.

Of his numerous portraits, we shall only mention tho'e of Maximilian Emanuel, ecclesiastical prince of Bavaria, after T. Macolinus Muicena, dated 1670, a rare print. Maximilian Emanuel, elector of Bavaria, after J. B. Champagne, both in folio, and the latter esteemed one of his very best performances. An equidrían statue, also of his patron, and Henrietta Maria Adelaide, duchess of Bavaria, after Detallou, dated 1675, an oval, and also of folio dimensions.

Of his historical works the principal are, a set of thirteen plates of different sizes, of the histories of the emperor Otho and Louis of Bavaria, from the tapestries in the castle of Munich, which were executed after P. Camillett. Another set of nine in folio, from the same tapestries, representing personifications of the months September, October, and November, the four Seafons, Morning, and Night.

The family of Meyer flourished as artists, and chiefly as engravers, through two centuries. Joachim was born at Strauburg early in the sixteenth, and distinguished himself by engraving a set of sixty-two prints of combats with the sword.

Andrea was a native of Zurich, and engraved several views of
of towns, to which he affixed one or the other of the singular monograms which will be found in our third plate of those of the German school of engravers.

Dirick was born in the same city, and of the same family, in the year 1570, and his principal work of engravings is a set of portraits of the illustrious persons of Switzerland.

Roderich, and Conrad, Meyer, were the sons of Dirick. The engravings of the former are chiefly portraits, with some few emblematical prints; he was tolerably successful, and marked his prints as may be seen in our plate of German monograms. He was born in the year 1605, and lived only to the age of thirty-three.

His younger brother Conrad was born in the year 1618, and died at Zurich, the city of his nativity, in 1689. He produced a considerable number of prints which were chiefly from his own designs, among which are the cuts for an edition of Erasmus's Praecepta Folly. A set of five, which are termed a comparison of the present times with those of Noah and Lot. "The Deluge;" "The Last Judgment;" and "Memento Mori." A set of fifteen for the Mirror of Christians. A set of cuts for a dance of Death, partly invented by himself, and partly by his brother Roderich. And several sets of portraits of the burgomasters, reformers, and artists of Zurich.

He travelled about the same time, or a little earlier, at Nuremberg, but is presumed by Strutt to have been of the family as the precocious. He etched, among other plates, a set of battles in a flight but spirited style, from his own compositions.

Felix Meyer was more celebrated. He was born at Winterhour, in Switzerland, in the year 1635, and died at Leyden in 1715; his genius developed itself at Nuremberg, whilst studying under F. Ermel, a celebrated painter of landscape, to which he afterwards added the study of nature. His etchings are deservedly held in esteem among connoisseurs, for the freedom and intelligence which they display, combined with effective chiaro-recto. The most important of these are, a set of twelve, ornamented with ruined edifices and rocks, &c. Another set of four of the scenery of Switzerland, with ancient monuments and figures, dated 1701. Another set of four of the same kind of subjects, and another set of the same number, of a more wild, mountainous, and rocky character, all of the 4to dimensions.

Joachim Francois Betch, or Bisch, was born at Munich in the year 1665, and died in the same city, in 1748. He studied the principles of design under his father, who was a painter of Nuremberg, but domiciled at Munich. They both painted landscape and battles, and Joachim travelled to Italy for improvement, where he resided for several years, contemplating the scenery of that classical landscape country, and the works of Gaspur Poussin and Salzvater Roth.

On his return to Munich, he took up the etching point with success, and produced several sets of plates of landscape scenery in a grand style, among which the principal are, a set of eight mountainous landscapes from his own compositions, in 4to. Another set of six. Another set of six with rocks, cataracts, and bauditi, in the style of Salvator Roth, of the folio size.

George Philip Rugendas of Augsburg was born in the year 1666. He learned drawing of Isaak Fichler, but afterwards studied with more advantage from the works of Pietro Tempella, and Bourgognone. He travelled to Vienna, from thence to Venice, and from thence to Rome, where he remained a long time, and resided Augsburg in the year 1695. At this time the war of the Spanish succession was raging in Germany, and our artist had opportunity to contemplate its effects, and draw battles, skirmishes, and sieges, from nature. Among these the bombardment and taking of his native city by the French and Bavarians, formed an interesting subject for his pencil and etching needle, and he published in six prints, their military operations in that neighbourhood during the years 1703 and 1704.

Rugendas deservedly holds a distinguished rank among battle painters. His designs are at once bold and correct, his composition orderly, his pencil facile, and his colouring performed on principle; above all, the varied attitudes and graces of his cavalry are justly admired.

Besides the pictures from his hand, which are not uncommon in the galleries and cabinets of Germany, Rugendas has performed a considerable number of etchings and plates in mezzotinto, of which the subjects are chiefly hunting and battles; some by himself, and others in conjunction with his sons, of whom he had three that were educated to the arts.


The following were produced in conjunction with his sons: A pair of "Mountainous Landscapes," in 4to. A pair of "Combats between Cavalry," A set of four, of "Marches and Halts." Another set of four, of "Camp and Scirmishes," all in 4to. A set of six, of "The Engagements of the Camp." Two sets of Battles, consisting of six in each. A set of eight, of "Marches, Halts, and Combats of Cavalry," all in folio; and a set of twenty of various military subjects, in 4to.

Jaques Christophe le Blond, or Blon, an engraver in mezzotinto, was born at Frankfort in 1670. He travelled to Rome in the year 1696, in the suite of the imperial ambassador, where he studied painting under Carlo Maratti, but his genius being of a mechanical turn, he entered with warmth into various speculations: at length he learned to etch mezzotintas, and discovered a method of printing mezzotinto plates in colours. The Dutch painter Overbeck persuaded him to bring his new discovery to Amsterdam, from whence he emigrated to England.

Eagerly bent on the execution of his new project, he executed in London several large plates in mezzotinto, from pictures by the greatest masters, and disposed of the prints by lottery; but those who obtained the prizes appear not to have held them in any very great estimation. He made known the manner in which he performed and printed these plates, in a book entitled "Coloritto, or the Harmony of Colours in Painting, reduced to mechanical practice, under easy precepts and infallible rules," which were printed both in English and French; but nothing is more common than the failure of infallible precepts, and the spirit of fine art has always evaporated in the various attempts to reduce it to mechanical practice. Le Blond's project did not succeed.

His afterward set on foot a scheme for copying the Cartoons of Raphael in tapestry, and made drawings for that purpose; but though money was subscribed, houses built, and looms erected at the Mulberry-ground, near Chisleth, this project also failed, and poor le Blond, to the no small
difficulties of those who were engaged with him, was obliged to disappear. He died at Paris in the year 1749, in an hospital.

The mezzotintos which he produced are not without a considerable share of merit; but in his colouring process he was not always equally successful. The present writer has been fonder, which, in respect of colouring, may be called good, and others which can scarcely be described as any thing better than bad. His colours are rarely vivid and fresh, but frequently flat and dirty, and his drawing of the naked is incorrect, especially in the extremities of his figures. On the whole, his portraits will probably be found to be his best performances. of which the principal, are those of King George II in large folio, the size of life: his queen, as a companion print. The three children of King Charles I. after Vandyck, in large folio. Carendolet, after Raphael. Sir Peter Paul Rubens, after Vandyck. And a noble Venetian, with a pointed beard, after Titian, all in very large folio, the size of life.


Jean Martin Bernigeroth was the son and pupil of Martin. He was born at Leipsick in the year 1713, and died in the same city in 1749. He professed about the same portion of talent with his father; his best work being a portrait of Jean Adolphus, Duke of Saxe Weissenfelsen, in folio, dated 1735, which scarcely rises above mediocrity.

Antoine Balthasar Koenig was born at Berlin in the year 1679, and died in the same city some time about 1740. His prints, of which the following portraits are those which are held in most esteem, are not without a certain portion of merit. Frederick William, king of Prussia, after Weidemann. Frederick baron de Drefflinger, general of Prussian cavalry. Charles Gottfried Schrader, allei counsellor to the king of Prussia. Alexander Hermann, Count de Wartenfelsen, after Ant. Pern, dated 1716. And the monument of Schrader, with a Latin inscription.

Christian Albert Wortmann was born in Pomerania some time about 1669. He went very young to Berlin, where he studied engraving under Wolfgang, and at the age of twenty-five was fummoned to Cæcil, where he became engraver to the landgrave of Hesse. From Cæcil he went to Dresden, where he engraved several portraits, and among the rest his celebrated head of Christian Frederick Boeitius. In the year 1727, Wortmann was called to the court of Puferburb, but the time and place of his death have not been recorded.

His principal engravings are the portraits of Ernst Louis, landgrave of Hesse Darmstadt. Christian Frederick Boeitius. Joachimius Julius Breithaupt, doctor in theology, after J. A. Rudiger. Johan Samuel Drofisbach. Hermann Joachim Hahn. Anna, empress of Ruflia, after L. Caravac. Alexis, son of Peter 1. In an age and country of low taste, an indifferent painter or engraver of portraits will find encouragement, though an artil of no other description could find subsistence. Among the petty courts of the German electors, there was probably at this time very little taste, yet observation enough to discriminate between two or more set of features; and personal vanity and courtly pomp enough, to catch at the means of attaining a certain species of perilable popularity.

We have passed lightly over engravers of this inferior description, and some we have entirely omitted, as they contributed nothing toward the advancement of art, but rather perhaps retarded its advancement.

From these men of inconstancy, attention turns with pleasure to the contemplation of the extraordinary powers of Jacob, or Giacomo Frey. Frey was born at Lucerne in Switzerland, in the year 1671, and his life presents a curious instance of the indolent and indolent of genius, which it would seem that no rigour of adversity fortune can subdue, and no fire of intermittent passions can consume.

He was apprenticed to the trade of a cartwright, and in spite of his propensities towards the fine arts, was obliged to follow that trade till he attained the age of two and twenty, when he somehow or other made his way to Rome; but in quitting the peaceful and placid vale of Lucerne, he seems to have broken loose from all sordid restraint, and on his arrival in Italy, his passions, which had hitherto been held in check, hurried him into every dangerous excess. Yet, as the fame Po, which roars and rises down the Alps, winds afterward a lately river through the plains of Italy, so it was with our artist: when the ebullition of passion was over, he listened with delight to the advice of Arnold van Wirtzenhout, and the instructions of Carlo Maratti, and from that period began to make surprising progress in the art of engraving.

A Speech of Maratti to Giacomo Frey, which strongly marks his good sense and observation, has been recorded: "The engravers of history (said he) make too much use of the burin, and hence arise a certain hardnes of the contours, from which, however, the best prints of Dorgny are comparatively free. I would advise you to familiarise yourself with the etching point, because it operates in a far more picturesque manner than the graver."

Frey followed this advice. Robert vanAudenarde was at this time his fellow-disciple and liberal rival, but the rapid strides of our artist left him at an immense distance, though a man of ability. He drew with superior taste; had a fine eye for the harmony both of colours and chiaro-fosco; etched with a degree of spirit and freedom, which have very rarely been attained; worked over and refinished his etchings with the graver, at once with firness and facility; incorporating the whole by means of such exquisite feeling of the merits of his originall, that it has been emphatically said of his prints, that they appear rather printed than engraved. He was the Gerard Andran of Italy, and seemed only to differ from Andran himself, as Raphael, Guido, Dominichino, and Guercino, (after whom his principal works are engraved,) differ from Le Brun. In short, his feeling for the peculiar excellencies of the first masters of the Italian schools was of the highest and purest kind; so that it may be said, almost without a metaphor, that in his engravings their forms appear revivified by the spirit of Giacomo Frey. He died at Rome in the year 1752, the adulation of every intelligent artist, yet before he had received more than an earnest of the praises that are justly due to him.

It is to be regretted, that when his plates, which were published by his son Philip, began to wear, they were injudiciously retouched, perhaps by Philip himself, who destroyed all his father's sweetness and harmonious mellowness; so that good impressions of the prints of Frey, in their original
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Bernard Vogel was the coadjutor of Heils, some of whose very large plates being engraved by them in conjunction. He was a native of Nuremberg, born in 1685, but removed chiefly to Augsburg, where he espoused the daughter of Heils. In the earlier part of his career, he produced some tolerably good portraits with the graver, but latterly engraved only in mezzotinto. He retired from Augsburg to his native city, probably after the death of his father-in-law, and died there in the year 1757, leaving behind him a son, Jean Christoph, who engraved several plates in mezzotinto, after Kupetzky.

The best works of Bernard Vogel are the portraits, performed with the graver, of Johan Michael Weickmann, after L. C. Eichler; Augustus Hermann Franckius, professor of theology; and Johannes Michael Wefler, senator of Nuremberg, after J. C. Hirthmann, all in folio.

The chief of his portraits in mezzotinto, are those of Johannes Kupetzky, painter, dated the year of our author’s death; Michael Gottfried Witter, a celebrated furgeon, after Kupetzky; and George Biedinger, the painter, all in folio.

Christopher Vogel engraved, in the same manner, the portrait of his father, inscribed “Chalcographus Novus.”

Jean George Bergmuller was born at Dirkheim, in Bavaria, A.D. 1687, and died at Augsburg in 1756. He learned the rudiments of art under Andrea Walt, of Munich, but afterwards studied with more advantage under Carlo Maratti. He painted successfully, both in oil and in fresco, and etched a great number of plates, in an able and masterly style, which he afterwards finished with the graver. He was likewise the author of two works; one on the growth of man, which he called “Antropometria;” the other on mensuration and architecture, published 1752, and became director of the Academy of Arts, which was established at Augsburg. His son, Jean Baptiste, also followed the art of engraving with some success.


Jean Daniel Herz, draughtsman and engraver in aquafortis, was born at Augsburg A.D. 1693, and died in the same city in 1754.

Herz was an artist of original powers, rich in composition, bold and rough in execution, but deficient in grace and harmony of parts. He was appointed director of the imperial academy of arts at Augsburg, and filled the office with credit; but an hereditary director of an academy, nature, and science, will not endure, and his son Daniel, to whom the directorship unfortunately devolved, soon made himself appear ridiculous in this situation, though he was a tolerably good knight of the holy Roman empire.

The style of execution of Herz the elder bears marks of great rapidity, and rapid he must have been, for his plates are numerous, and some of them of very large dimensions.

We have selected the following, as those which, on the whole, are most worthy of the portfolio of the connoisseur; “The Annunciation,” richly compos’d, and in very large folio; “The Resting of the Cross;” “The Affirmation of the Virgin;” “The Adoration of the Kings;” “An Ecce Homo;” “The Crucifixion;” “The Death of Anna;” “The Dispute between St. Paul and the Philosophers;”
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Sphers of Athens." And "The Judgment of Solomon;" all in very large folio. "The Coronation Procession of Queen Maria Theresia at Prefsbourg;" also of very large dimensions.

Jean Elie Ridinger, a very distinguished engraver of animals, was born at Ulm in the year 1695, and died at Augsburg in 1737. His father was a reputable drawing master, and from him our artist received his earliest instructions in the art. He afterwards studied painting under Christophorus Reifels, but as an engraver studied nature alone, and was one of her successful votaries. He formed a style of engraving animals for himself, which confit chiefly of etching, which is performed with characteristic freedom and firmness, tempered and harmonized, without being over laboured, with the graver. He appears to have studied in the wildest and most unfrequented recesses of the forests of Germany, and the back grounds of his savage animals are conceived and executed in a grand and masterly style, occasionally displaying all the wild vigour of luxuriant and uncontrolled vegetation, which can only be contemplated in the depths of untraveled forests, and occasionally in his dens of bears, tygers, lynxes, &c. the mott barren and dismal rocky solitudes, infomuch that the reflecting spectator is led to wonder, either at the bold truths and fertility of a daring imagination, or, if he believes that Ridinger has really visited such scenes, at the danger he must have escaped.

Nor are his portraits of wild and ferocious animals, less than his landscape scenery, the result of vigorous observation, and extensive power over the instruments of his art. In tracing their habits and manners, he combined the exactitude of a naturalist with the talents of a consummate artist.

Several of Ridinger's prints may be called historical, being representations of chafes which really took place in his time, and at which he must have been present, in the forests of Germany, with portraits of the animals that were killed or taken, and that these engravings there is generally a particular description, or history, of the chafe, in the German language.

He did not, however, draw the human figure, nor that of the horse, with equal ability; and though his chiaroscuro he often effective, yet in many instances his lights are too much scattered. He worked from his own compositions, and sometimes painted, as well as engraved, a favourite subject, but his pictures are not common. The most esteemed of his numerous engravings are those which follow:

1. "The Terrestrial Paradise," a set of twelve large folio plates, in which are introduced, in an appropriate manner, all the various animals; the subjects are connected by means of the history of Adam and Eve. These are grand compositions, finely executed, and in England but rarely seen. A set of sixteen fables. A set of heads of wolves and foxes, finely executed. A set of four large upright folios, which by some are esteemed the masterpieces of Ridinger, and two of which, representing "Bears fighting on a Stag," and a haunt of "Wild Boars in a Forest," are more especially to be admired. A pair of "Stag-hunting" and "Bear-hunting," in large folio, both designed from nature. Another pair of hunting pieces, of "The large Wild Boar with double Turtles," and "The Stag in Rutting-time," dated 1755, and 1757, taken by the duke and duchess of Wirtemberg. A set of sixteen hunting pieces of the larger and smaller game, as practiced in the different plates of Germany, with German and French explanations beneath, rich and interlacing compositions. A set of twelve plates of savage and carnivorous animals, all in large folio, and after his own designs.

Ridinger also engraved, with his usual ability, a lion-hunt, after Rubens.

The Preißlers were a numerous family of engravers, whom we shall pass with brief notices, as they rarely rose above mediocrity.

Jean Daniel Preißler, an engraver of portraits, was of Nuremberg, and lived at the close of the seventeenth and beginning of the eighteenth centuries. His son Jean Justin was born in the same city in the year 1695, and died there in 1771. He resided in Italy a considerable time, and became director of the Imperial academy of Augsburg. His most distinguished works are "The Apotheosis of Zenes." A set of the four elements, after Edmond Bouchardon; and another set of the four parts of the day, all in folio. A set of fifty plates of the antique statues preferred at Rome, from drawings by Bouchardon; small uprights. The circulars of the Jesuits' church at Antwerp, after Rubens, consisting of twenty small plates, exclusive of the portraits of Rubens and Vandyke.

George Martin Preißler, a younger brother of Jean Justin, was also of Nuremberg; he engraved, in the family style, a considerable number of portraits, and a set of twenty-one plates of statues, at Rome and at Florence, from drawings by his brother Jean Martin.

The engraving of Valentine Daniel, another son of Jean Daniel Preißler, was chiefly confined to book plates and portraits.

Jean Martin Preißler, the fourth son of Jean Daniel, travelled from Nuremberg to Rome for improvement, and became, on the whole, perhaps, the best engraver of the family. He accepted an invitation to Denmark, and was living in good repute at Copenhagen in the year 1770. His style is clear and neat, but deficient in vigour, and his best prints are; "Christ bearing his Cross," a large folio, from Paolo Veronese. "Semiramis, placing the Crown of Ninus upon her own Head," from Guido, a large folio, engraved with the former, for the Dresden gallery. "A Battle," from Pasaocel, and a Bacchanalian subject, from Pierre, both in large folio.

Jean Alexander Thiele was born at Erfurt in the year 1695, and from the rank of a common soldier rose to be a distinguished engraver and painter of landscapes. A decided taste for this art, and some pictures of Agricola, which it was his good fortune to see and copy in diftemper, introduced him to the notice of that artist, by whose instructions he failed not to profit. He is believed to have been the first in Germany who attempted to paint landscape in engravings, which, though an ineligible mode of art, is a proof of his ingenuity; he afterwards acquired a knowledge of oil-painting under Mencky, in which he gloried, and in which he excelled.

His study was the romantic part of Saxony, and more especially the banks of the Elbe and the Saha. His etchings, of which the subjects of the principal are named below, are rude but masterly. The celebrated Dietrich studied under him at Dresden, where he left a son, and where he died in the year 1752.

A pair of mountainous landscapes, adorned with ruins of ancient buildings, dated 1725, in folio, and very rare; a pair of smaller landscapes, of more rustic character; a set of three mountainous landscapes; a landscape of grander character, adorned with ruined monuments of antiquity, in quarto; a pair of "The Ancient Port or Mouth of the Elbe," drawn from nature, and dated 1742; a pair of views at Naumburg, all in quarto; a set of six of superior execution, from nature, including views of Pilnitz, Konigstein, Müllen, and Dresden, dated 1726, in large folio.

Paul Troger was born at Zell, in the bishopric of Brixen, in the year 1665, and died at Vienna in 1777. He studied the rudiments of his profession in his birth-place, and afterwards travelled.
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Their grandfather, a general in the Imperial service, lost much of his property by the accidents of war; and the inidelity of the tutor to whom he had entrusted the education of his son, reduced that son to grievous extremities, but his sufferings struck out a talent with which it now appeared that nature had endowed him. He acquired the art of engraving on iron and steel, and ornamented locks and firearms with much taste.

He brought up his sons, the brothers of whom we treat, to the profession of gun-engraving, which they quitted for the more elegant art of engraving on copper. Jean Adam was the eldest, but, in spite of application, could never attain to the eminence of Joseph and Andrea. He engraved, however, for the gallery of Vienna under Altomonte, and his best prints are the portraits of the three empresses Eleonora, Amelia, and Elizabeth.

Joseph and Andrea generally, if not always, worked in concert, and affixed their names, sometimes Joseph and Andrea, as at others Andrea and Joseph, Schmutzer, with brotherly alternation. Joseph possessed dexterity both in etching and re-entering with the graver, and Andrea possessed great facility in managing the tool, which was the necessary result of his being educated to engrave on steel, and to which he added a careful study of the works of Bolivert, and Van Dalem. The best prints from the gravers of these brothers are the portraits of the emperors Charles VI. on foot, after M. de Meytens; the empress Elisabeth Christina, after J. G. Auerbach; Guastavus Adolphus, baron de Gotter, Prussian minister of state; and Leymann, a librarian, of Vienna, all in folio, and the two latter, also after Auerbach. A pair of ancient temples, in large folio, decorated with statues and trophies, after Joseph Galli Bibiena.

But their most distinguished work is three folio plates, from Rubens's life of Decius, in the gallery of the prince of Lichtenstein.

Jacques Schmutzer was the son of Andrea, and had the misfortune to lose his father when he was seventeen years of age. By what further misfortune he came now to be so very young, he was employed partly as a butcher and partly as a shepherd, is not known, but he was employed to watch sheep, sometimes in the fields, but more frequently when penned up for slaughter. The public drawing-school, however, was in the neighbourhood of the sheep-pens, and his love for art often induced him to confide his dog to some indolent comrade, whilst he strolled away to draw with the students of the academy.

The celebrated medalist Matthew Donner, apprized of these circumstances, took some notice of the lad, and invited him home; but by some new accident or impulse, he now began to study architecture, which pursuit he did not afterwards renounce for the arts of design. He was employed for three years as an architect in Hungary, during which time he designed and painted and engraved historical subjects at his leisure hours, and on his return to Vienna, continued occasionally to practice architecture.

He had now the good fortune to become known to the baron de Kettler, a great patron and protector of art and artists, who, charmed with his essays in engraving, solicited the prince Kamenz, and the empress queen, to send the young Schmutzer to Paris; his solicitations were attended to, and our young engraver was placed under the guidance of Wille; here he perfected himself in the art, and in the course of the four years he remained in that celebrated metropolis, learned to use the graver with mastery intelligence. He was now recalled to Vienna, with high rank in his profession, and was named by Maria Theresa a Director of the academy.
academy. He superintended the education of a great number of students in his mature age, and at the close of the last century, was as great at Vienna, as Wille in Paris.

The best of Schmutzer’s engravings are the portraits of Don Emanuel, of the illustrious family of Delvèrs, and Joseph von Sonnenfels, both small; Martin de Meyens, the celebrated painter, after a picture by himself, dated 1756; C. G. E. Debriric, another celebrated artist, after the same, dated 1755; Joseph Weneclaus, prince of Lichtenstein, after V. Fanti; the emperor Francis I., after von Liotard, dated 1769; the companion to which is the engraver Maria Thereza; and two portraits of prince Kaunitz, one after J. Steiner, and the other after Hagenauer, dated 1786, in a circle; a much esteemed and rare piece of engraving.

The above are all in folio. We now proceed to select from his historical engravings, Ulysses discovering Alcyone and Andromache,” after the prince of Saxe Tcthen, dedicated and engraved the archduchess; “Marius Scarsola before Porfella,” from a picture by Rubens in the cabinet of the prince Kaunitz, dated 1758; “St. Gregory refusing to admit the emperor Theodosius into the Church,” after the same master, both plates in folio, and of learned execution; “Venus rising from the Sea,” from a picture by Rubens, in the gallery of count Schoenborn at Vienna, beautifully finished, and four large and interesting landscape views at Neuwaldeck and Dornabach, in which occurs the tomb of Roulleau, and the statues of the Gladiator and the god Mars.

George Frederic Schmidt was born at Berlin A. D. 1712, and died in the same city in 1775. Schmidt was defined by Fortune to be a tradesman, but the voice of Huger, (says Huber,) proclaimed him an artist. His perseverance, after various struggles, at length, surmounted the obstacles that opposed themselves to the gratification of his natural propensities, and he was admitted a student in the school of George Patel Butch at Berlin, from whence his ambition, rather than his parle, in the year 1736, carried him to Paris, where he frequented the school of Nicholas de Larmenin, who honestly and successfully founded the professed public business of Schmidt, by imparting to his disciple all that it was possible to communicate of his knowledge of the art of engraving.

In the year 1742 he was admitted a member of the French academy of Arts, although (which at that time was an important exception) he was of the Protestant religion. At this time Schmidt, Prieiler, and Wille (of whom the reader will find an account under French School of Engravers) were distinguished at Paris by their superior merit in engraving, and were bound together by the ties of friendship, while there reigned between them a noble professed emulation. Schmidt had recommended himself to the friendly regard of the celebrated Rigaud by the very fine portrait of P. Mignard, which he engraved for his reception into the Royal Academy, and Rigaud contributed to his spreading reputation, by seeking and obtaining for him such engagements as were analogous to his wishes and talents.

In two years, however, or a little more, he was summoned to Berlin, and nominated engraver royal, and in the year 1757 he was sent from to Peterburg by the empress Elizabeth, to engrave her portrait, which he executed (with many others, while he remained in Russia) to the great satisfaction, not only of the connoisseurs of the court, but of the best judges throughout the Russian empire.

On his return to Berlin, in 1762, he began to distinguish himself in a new career of engraving, by etching in a picturesque style after the works of Rembrandt, in which he imitated Rembrandt’s own mode of execution, but generally bit-in his plates to deeper tones.

The engravings of Schmidt amount in number to nearly two hundred, beside the vignettes which he did for the works of the king of Prussia. Count Crayon published a catalogue raisonné of the whole, from which we have thought the following most worthy of selection, as specimens of the various powers of our artist.

Portraits performed chiefly with the Graver, and of folio dimensions.—Conlieanisse Scarabatti, prince of Moldavia, a rare and fine print, dated 1738; Charles Gabriel de Tubieres de Caylus, bishop of Axerre, after Fontaine; Louis de la Tour d’Auvergne comte d’Eveux, after H. Rigaud, dated 1742; Johannes Baptista Rofleau, after J. Aved, dated 1740; Charles de St. Alvin, archbishop of Cambrai, after H. Rigaud, dated 1742; Maurice Quinten de la Tour, from a picture by himself, dated 1742; Jean Baptiste Silva, a celebrated physician, after Rigaud, dated 1743; Pierre Mignard, first painter to the French king, after his friend Hysainte Rigaud, engraved in 1744, for Schmidt’s reception into the academy, a piece regarded by connoisseurs as a chef d’ouvre of the masters, and the whole of which is etched in a style so soft and mellow, that it has been emphatically said to be rather painted than engraved. The four last are in large folio.

After his return from Paris to his native city, Schmidt engraved the portraits of Antony Pefne, first painter to the king of Prussia, and Samuel Baro liber de Coceci, both in folio, dated 1751 and 1753, and reckoned among the best portraits from the graver of Schmidt.

Johannes Theodore Eiller, aide-counsellor, &c. after Pefne; and Louis Albertene de Brandt baron de Grapendorff, after de Sueré, are a very rare and beautiful pair of portraits of the folio fize.

Among the best portraits which our artist engraved at Peterburg, are those of Michel de Woronzow, count of the Holy Roman empire, and Nicholas Ellerhazy de Galantha, both in large folio, after L. Toque, and dated 1758; Pierre Comte de Schunallow, grand-maître of the Prussian artillery, from the life, and dated 1760; the empress Elizabeth of Russia, after Schmidt, in a magnificent folio, the accompaniments of the imperial costume; after L. Toque, which Huber calls a superb print, more especially for the execution of the accessory parts, it is dated 1758; Count Cyriliss de Rafuonskoy, after L. Toque, and Jacobus Mounley, from a picture by Schmidt himself, dated 1762, are rare and beautiful, and M. de Katt, field marshal and minister of state to the king of Prussia; the whole portrait from the graver of Schmidt, the head in which is by himself, but the rest finished by Bercy the elder.

Among his historical and fancy works, may be distinguished a pair of “The fair Greek,” and “The amorous Turk,” the two first plates which Schmidt engraved under Larmenin at Paris; “Tahaghe Flamande,” &c. in folio, after Oliade, engraved in a style resembling that of Willich, and dated 1757; “The Virgin Mary fitting with the Infants Christ and St. John,” after Vandyke, dated 1773; “The Virgin at Prayers,” after S. Ferrata; “The Presentation in the Temple,” after Pietro Pellet, for the Imperial gallery at Peterburg; “Alexander and Philip the Physician,” after Annibal Carracci, engraved in imitation of the historical style of Gerard Audran, at Berlin 1759, and “Timocles justified by Alexander,” companion to the above, and after the same painter, both in large folio.

In imitation of the style of Rembrandt.—A half length of a bearded old man with a feathered bonnet, designed by the engraver, and an old woman in profile, after Rembrandt, companion to the above; bust of an Oriental in the style of Callighone, dated 1750; bust of a young man in a Rembrandt.
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Rembrandt head-dress; an old man habited as a Persian, after Rembrandt; portrait of a young female, and portrait of a young figure, from the same master; the Jewish bride, and the father of the Jewish bride, both after Rembrandt, and from the collection of the count de Kamb; the profiles of Salimbeni, and count Algarotti; the portrait of the engraver himself, inscribed "Georg Fridrich Schmidt; Königl. Preufl. Hof. Kupferstecher Mitglied der Maler Academien zu Berlin & Paris," dated 1752.

His best historical works, in the style of Rembrandt, are, "Jesus Christ presented to the People, and buffetted by the Soldiers," after Rembrandt, dated 1756. "The Refutation of the Daughter of Jarius," after Rembrandt, with a very fine chiaro-furo, dated 1767. "The Presentation in the Temple," after Dietrich, companion to the above. "The Philosopher in his Grot," by some called Anchises taking refuge in his grotto during the sack of Troy, in the background of which is a city in flames, after Rembrandt, and dated 1768. "The Repentance of St. Peter," after Fr. Bol. "Lot and his Daughters," after Rembrandt, from a picture in the possession of prince Henry of Prussia, to whom the print is dedicated, and the funeral monument of Sir Andrew Mitchell, knight of the Bath, and ambassador from the king of Great Britain, who died at Berlin in 1771; the two last are of folio dimensions.

Joseph Wagner was born A. D. 1756, at Thalendorf, on the lake of Constance, and died at Venice some time about the year 1790. He learned the art of design under J. Amicoz, whom he accompanied to England and to Italy, and, obedient to the advice of this master, he afterwards travelled to Paris, and studied engraving with very considerable success under Laurent Cars. In the year 1756 he settled at Venice; began to publish there the engravings of himself and pupils, and finally established a beneficial commerce with several parts of Europe. Among his disciples were Flippart, Berardi, and, above all, Bartolozzi, whole talents have done honour to his master, to himself, to Italy, and to England, and who still lives engraving in Portugal and the Dutch East Indies.

The style of Wagner's engraving is particularly easy and engaging, and is in fine art, what in manner we term amiable. It is built on the firm foundation of sound drawing; and partakes highly of the merits of Gerard Audran and Giacomo Frey. Like them he harmoniously mingled etching with the work of the graver and dry needle, and, like them, he evinced a high feeling of the merits of those matters after whom it was his fortune to engrave.

The elements of his style are, vigour tempered with mildness and finitude; hence he is delicately hold, and, without the least appearance of labour, produces, in his best works, an effect of finishing, which other labour after in vain, and which is more particularly observable and appropriate in infantile subjects, or where he has to touch the imagination with indefinite grace. In his figures of the Infant Saviour and St. John, where the characters in his original allowed him to be so, he is, indeed, the flamingo of his art; though if living artists had found a place in our Cyclopædia, that honour mull rather have been awarded to the most distinguished of his pupils.

Wagner's first attempts in engraving are said to have been the portraits of the English princesses Anne, Amelia, and Caroline, daughters of George II. Of his other portraits, the most remarkable are, a pair in folio, whole length figures of the empress Anne of Russia, and Peter the Great, conducted by Minerva. The empress Elizabeth Petrowna, with a Russian inscription, and 'Farselli crowned' by the Mufe of Harmony; all in folio, and after his first master, Amicoz.


A set of large landscapes, ornamented with Italian pastoral figures, after Zucarelli, and executed with much taste, and after Weigler, in conjunction with Bartolozzi.

GERMAN SCHOOL OF MUSIC. Though the language and national style of singing in Germany are much inferior to those of Italy, the instrumental music of that country is indisputably the first in the world. It is true that the violin is infinitely obliged to Corelli, Geminiani, Samis, Tartini, and Boccherini; but for symphonies, and the union of wind-instruments with those of the bow, the Italians have nothing at present, equal to the full pieces of the elder Stamitz, Vanhal, Haydn, and Mozart; nor on key-instruments have they any compositions equal to those of Emanuel Bach, Haydn, Mozart, and several other great clavecinists. And though the best German fingers are, in general, inferior to the piazzas, or streetingers of Italy; yet Germany has, now and then, furnished a vocal performer equal to the best of Italy: such as Raaf, the Mingotti, the Tauber, the Toni, Mars, &c.

M. Suard, ci-devant member de l'Academie Françoise, an extremely severe and finishious critic of the dramatic music of Italy, and a determined Gluckist, begins a chapter on music in the Encyclopædie Methodique on the history of music in Germany, and after the article confines of twelve quarto pages, only four or five of them are bestowed on German music in general, before the author hastens to his hero Gluck, whose life he gives, and an ample list of his works, since he quitted the Italian style of composition for that of France. All this is minutely and ably done, and would be satisfactory to all musical readers, if the author's zeal for Gluck, and his style were not ex适ive, and his cenures so severe, of all that has been admired in Italy, both in composition and performance, by all the rest of Europe, except France. No vocal compositions but those of Gluck escape condemnation. Metastasio's dramas are not written to his mind. The composers are too florid, and the singing too important.

If M. Suard had confided that the style of singing in France was bad, and that its native public fingers were unable to execute such longs as the great Italian masters have composed; and therefore that it was most prudent to have as little singing as possible; the airs very short and simple, no introductory symphonies, or ritornelles to impede the progress of the drama; to let the poet above the composer, and the actor above the singer; with these concessions all Europe would have admitted his reasoning to be just; but when M. Suard infists on all Europe implicitly following the French model in musical dramas; that where great opera composers and refined fingers abound, they are not to be employed,
played, but that the melo-drama, to render it interesting, should never admit an air superior to an elegant ballad, is what lovers of dramatic music, and judges of good composition and good singing, will never subscribe to.

But though M. Suard is so determined a foe to all opera music but that of Gluck, and singing, except that of the natives of his own country, when he speaks of the instrumental music of Germany, he is very just, and celebrates the schools of Vienna, Coblenz, Madeleine, Munich, and Stuttgart; which have produced the Stattzites, the Touchius, Canacchi, Schroeters, Haydns, and innumerable other symphonists, whose compositions are known to all lovers of music. All these different symphonists (fays with great truth M. Suard) have a peculiar character and style of their own; yet, continues he, "it must be allowed that all give way to the inexhaustible Haydn for invention and originality. He unites all the resources of science to the charms of good taste; he is noble and gay, full of grace and force; simple with infinite variety; and unites to movements the most sweet and captivating in melody, the greatest orchestral effects."

This character is written with such truth, intelligence, and feeling, that we forgive the elegant and refined writer much of his bigotry for Gluck, and intolerance for all dramatic music, except that of France.

No praise is too strong for the instrumental music of Germany, in general, by the composers so justly celebrated by M. Suard; but when to these we join Emanuel Bach, and the admirable Mozart, and his scholar Beethoven, it seems as if instrumental music, at least, was arrived at its acme of perfection. This extensive empire has likewise produced masters who have ever equalled the most eminent Italian dramatic composers of the last century; such as Handel, Hasse, Graun, J. C. Bach, Millovecce, Gluck, Naunmull, &c., without mentioning the operas, oratorios, and masses of Haydn, and the dramatic music of Mozart, perhaps the best of its kind. So that Germany may be said frequently to vie with Italy itself in its own belfy of composition.

GERMANY, in Geography, a township of America, in Fayette county, Pennsylvania; containing 1335 inhabitants.

GERMAN Flats, the chief and post-town of Herkimer county, in the state of New York, situated on the N. side of Mohawk river, opposite to Herkimer, and 24 miles E. of White-town; and containing 1637 inhabitants.

GERMAN TOWN, a town of New York, in Columbia county, containing 516 inhabitants.—Also, a town of Philadelphia county, in the state of Pennsylvania, seven miles N. of the city of Philadelphia. It is a corporation, consisting chiefly of High and Low Dutch, and contains about 350 houses, chiefly of stone, some of which are large and elegant, forming one street about two miles in length. The public buildings are a Presbyterian, German-Calvinist and Lutheran church, a Friends' meeting-house, and an academy. Here is a considerable manufacture of flaxworks, made of cotton, thread, and worsted. This is an ancient town, pleasantly situated, and by its vicinity to the metropolis, well adapted for manufactures. The principal congregation of the Mennonites, and the parent of that sect in America, inhabits in this place. A severe battle was fought here between the English and Americans in October 1777.

GERMAN, in Botany. See Teucrium.

Teucrium, &c., the common germander, teucrium chamadry, chamadry minor repens, is a native of England, and flowers in June and July. The leaves and tops have a moderately bitter taste, accompanied with a weak aromatic flavour, diminished by drying the plant. They give out their virtues both to water and spirituous menstrua. The chamadry has been chiefly esteemed in the character of a mild aperient and carborant; it is recommended in uterine obstructions, intermitting fevers, and in the rheumatic and gout. The good effects of the chamadry in the latter disorder are recorded by different authors who have employed it in various forms and combinations, of which the celebrated antimonial, or Portland powder, is an instance. According to Murray the virtues of this plant should be nearly allied to those of marianum, and therefore promises to be useful in syphilitic affections, coughs, and inflammations of the lungs. These virtues, however, are somewhat problematical.

The Marian germamder, or Syrian herb melilot, teucrium marum, flowers from July till September. It is a native of Spain, and is said to grow plentifully also in Greece, Egypt, Creto, and Syria. It was first cultivated in England by Parkinson in 1640, and is now to be found in many of our gardens. The leaves and younger branches of marum, when recent, emit, on being rubbed between the fingers, a volatile aromatic smell, which excites sneezing, but to the taste they are bitterish, with a sensation of heat and astringency. According to Lewis (Med.) it lofts but little of its pungency by being dried; and gives out its active matter partially to water, and completely to rectified spirit. Diluted with the former, it yields a highly pungent, sublimate, volatile, effervescent oil, similar to that of fuscory-grafts, but stronger and of less perilous pungency. Rectified spirit carries off, in the infilpitation of the spirituous tincture, a considerable share of the smell and pungency of the marum, but leaves much the greatest part concentrated in the extract; which, on being boiled, fills the mouth with a durable, penetrating, glowing warmth. Wedelius strongly recommends this plant as an important remedy in many diseases requiring medicines of a flaviant, aromatic, and deoblituent quality; and infusions of its efficacious use have been adduced by Linnaeus, Rothenstein, and Bergius. At present, however, marum is here chiefly used as an emetic, and is an ingredient in the "puvis farii compotitii" of the London Pharmacopoeia. The dose of the powdered leaves is from a scruple to half a dram, which Murray advises to be given in wine.

The water germander, teucrium scordium, is a native of England, in marshy situations, and flowers in July and August. The leaves of scordium have a smell reminding that of garlic, whence its name; and to the taste they are bitterish, and moderately pungent. When moderately and newly dried, they give out, fays Lewis, (Med.) their smell and taste both to water and to rectified spirit. In dissillation their peculiar flavour arises with water, but the impregnation of the distilled fluid is not strong, nor could any essential oil be obtained on submitting to the operation several pounds of the herb. The ancients attributed to scordium a peculiar antiphlogistic and alexipharmic power, and it had for many ages the character of being remarkably efficacious in all pestilential and putrid diseases. With this view it entered into the composition of several official medicines, that were supposed to be antidotes to various kinds of poisons and infections.
ficulties. But, notwithstanding this celebrity, it appears to be a very insignificant article of the Materia Medica, and is therefore very justly fallen into disuse. Borrus, however, states its virtue to be "antiputredinosa. tonica, diaphoretica, diuretica, refolvens;" and some others recommend it to be employed externally in antifeptic cataplams and fomentations. Woodville Med. Bot.


Germâneia, in Botany, named by Lamarck after Monf. de Saint-Germain, a great admirer and cultivator of plants. Lamârc Dict. v. 2. 690. Illustr. t. 514. Jfl. 116. 449. See Phlephantus, which latter appellation, given by l'.Heritier, who was partially near to M. de Saint-Germain nor his admirers, has been universally adopted.

Germânia, in Geography, a port-town of Culpepper county, in Virginia; 82 miles from Washington.

Germânicia, in Ancient Geography, a town of Asia, situated on a plain between mount Taurus and mount Amanus, on the bank of a small river which runs into the Pyræanus, W. of the town.

Germânicopolis, a town of Bithynia, near the Propontis, called by Pliny Helges and Boos-Cate.—Allo, a town of Paphlagonia, called Gangra.—Allo, a town of Iauria.

Germânicus, Cæsar, in Biography, grand-nephew of Augustus, nephew of Tiberius, and grandson of Livia. When Augustus adopted Tiberius, he obliged him to adopt Germânicus, who thus, according to the Roman law, flood in the filial relation to them both. Germânicus married Agrippina, grand-daughter of Augustus, a lady not more illustrious for her rank than her virtues, and he himself grew up in the general affections of the public, on account of the excellence of his temper, and the mildness of his disposition, and was denounced the object of delight of the Roman people." Germânicus was very learned and eloquent, and, at an early age, he became illustrious in warfare, and was raised to the most important offices of the state. When Augustus died, he was engaged in a war in Germany, and the affections of the soldiers unanimously fainted him emperor. He refused the honour, and then appealed the tumult which his indifference to the rank had occasioned. He continued his exploits in Germany, and defeated the celebrated Arminius, and upon his return was rewarded with a triumph. The Germans fought with the greatest bravery, but were at length obliged to yield to superior discipline and generalship. The concluding battle was attended with great slaughter to the Germans, and gave the Roman commander occasion to raise a trophy with this inscription, "The nations between the Rhine and the Elbe subdued by the army of Tiberius Cæsar;" but this subjugation was only a temporary cessation of the contest, and, upon some disaster experienced by the Romans from the elements, the Germans renewed their attack, which afforded Germânicus an opportunity of acquiring new laurels, and he expected to have made an entire conquest of Germany, but the emperor, jealous of his successes, recalled him, with many compliments upon his past conduct, and the prospect of a second conquest. On his return he was honoured with another triumph, which was celebrated with extraordinary magnificence. That part of the spectacles which was most affecting to the Roman people, was the chariot of the victor, filled with his three sons and two daughters. Germânicus was soon sent into the East to quell some disturbances there; the powers entrusted to him on this occasion were very extensive, but the Calliphotus had placed Pifio as a spy and check on the illusory general. Germânicus entered upon his second consulship, having the emperor for his colleague; he visited Athens, and was received in that city with all the adulation usually practised by the inhabitants. He then failed to Euboea and Lebos, thence he touched upon Thrace, and, crossing into Asia, viewed the ruins of Tyre, and consulted the oracle at Colophon. Pifio hastily followed him, and after terrifying the Athenians with a fierce harangue, and throwing out infinuations against Germânicus, embarked for Rhodes, where he would have perished had he not been saved by the humane affiance of the prince, whom he overtook there. Germânicus now proceeded to execute his commission. He placed the crown on the head of Zeno, son of the king of Bruttus, an ally of the Romans. He employed Cappadocia and other places to the face of Roman provinces, and in the ensuing year he made a progress into Egypt, and viewed every thing that was deserving of notice in the country, at the same time opening the public granaries to the people, who were suffering under a scarcity. Upon his return from Egypt to Syria, he found that Pifio had abrogated every regulation which he had established among the legions, and in the cities, and his indignation at this behaviour widened the breach between them. At this time Germânicus was attacked with a disease which afterwards proved fatal, and which was imputed to the effects of poison, but some of our boldest historians, having impartially examined the collateral facts, do not think the evidence sufficient to justify the affirion. Germânicus himself had no doubt that he was the victim of the malignity of Pifio, and, in his last moments, conjured his friends to prosecute with the utmost vigour the authors of his death. He died at Epiphaneia, near Antioch, in the year 19, in the thirty-fourth year of his age. His death was the subject of universal lamentation at Rome. Every other concern was forgotten, and the people, without waiting for an order from the magistrates, forsook the forum, shut up their houses, and allowed every token of universal sorrow. A profusion of honours was decreed to his memory, and even foreign princes and nations joined their testimonies of esteem and regret. He had been highly esteemed not only for his military accomplishments, but also for his learning, humanity, and extensive benevolence. In the midst of war he devoted some moments to study, and he favoured the world with two Greek comedies, some epigrams, and a translation of Aratus in Latin verse. Tacitus, Suetonius, and Univr. Hist.

Germâno, in Geography, a town of Naples, in Lava, containing four parishes, four convents, and about 800 persons. Near this place are the ruins of "Caesaria," destroyed by Theodoric, king of the Goths. The town is situated 43 miles N. W. of Naples. N. lat. 41° 55' E. long. 15° 45'—Allo, a town of the duchy of Urbino; 13 miles E. N. E. of Urbino.—Allo, a town of France, in the department of the Sèvres, late in the lordship of Vercelli; four miles E. of St. Ja.—Allo, a town on the W. coast of the island of Porto Rico. N lat. 18° 20'. W. long. 67° 49'.

Germâns, so called from the name of their country, in Ecclesiastical History, one of the feeblest of rigid anabaptists into which the Flemings were divided; the other being denominations Flamdins and Frieländers. See Flemings.

Germânia, S. or Germânia, in Geography, a borough town of Cornwall, England. was, during the Anglo-Saxon era, a bishop's see. In 981, the Cornish bishop removed his see from Bodmin to this place; but bishop Lévinus translated it to Credington, in Devonshire in 1049. King Athelstan founded a priory for secular canons here; to which the cathedral buildings were annexed. Of these nothing remains but
but the church, which is a curious and interesting specimen of ancient architecture. It consists of a nave, two aisles, and two towers at the western end. Between the latter is a large entrance door-way, with a semi-circular arch, consisting of several ornamented mouldings. Contiguous to the church is Port-Eliot, the seat of Lord Eliot. St. Germans, as a borough, sends two members to parliament, both of whom are nominated and influenced by Lord Eliot. A small market is held here weekly; and two fairs annually. The living is a curacy in the gift of the dean and chapter of Windsor. The Rev. John Whittaker, author of "The History of Mancheller," &c. has published two volumes, quartos, entitled "The ancient Cathedral of Cornwall, historically surveyed." This work contains many curious particulars respecting St. Germans; but the greater part is occupied by theoretical dissertations.

**GERMANUS I. in Biography.** was patriarch of Constantinople in the beginning of the eighth century. His father was badly murdered by the emperor Constantine Pogontur, and himself, by the fame authority, was deprived of his manhood. In 715, he was appointed to the bishopric of Cyzicum, and from that honour he was translated to the patriarchate of Constantinople. He was the chief opponent of the emperor Leo, when he filled his edict for prohibiting the worship of images; during four years the emperor bore with patience all the resistance made to his decrees, till at length the people, irritated by his sufferings, broke out in acts of rebellion; to quell which, Leo assembled a council at Constantinople in 730, by which the patriarch was degraded from his dignity, but permitted to retire to his paternal seat, where he spent the remainder of his days in peace and quietness. He died in 744, and was immediately elevated as a saint in the Greek and Latin churches, on account of his zeal and sufferings in defence of image worship. He was author of several treatises; one, entitled "De lex Synodi Occumenici," &c. has gone through many editions, but that by Le Moyne in his "Varia Sacra," in 1685, is by much the best. He wrote: "An Apology for St. Gregory Nyffen, in opposition to those who accused him of falling into the errors of Origen;" and divers other miscellaneous pieces which are inserted in the Collect. Concli. and in the Biblioth. Patr. Morei.

**GERMANUS II.** was patriarch of Constantinople in the thirteenth century, to which honour he was appointed about the year 1222. In 1233, he held a synod at the city of Nice, where he had fixed the patriarchal residence. He was one of those emperors who, by his misfortune, depeted from his dignity in the year 1249, but restored again just before his death, which happened in 1254. He was a writer of a work intended to illustrate the liturgy, and entitled "Reorum Ecclesiasticarum Theoria," and of numerous homilies, orations, sermons, epistles, decrees, &c.---There was a third Germanus, who was translated to the patriarchate of Constantinople, from the see of Adrianople in the year 1267, but who resigned his dignity within a few months after his election. Morei.

**GERMANY, in Geography.** an extensive country of Europe, situated between 45° 4' and 54° 40' N. lat. and between 6° 30' and 16° 52' E. long. comprises chiefly the present empire of Austria, except Hungary, the greatest part of the Prussian dominions, a part of Pomerania belonging to Sweden, the duchy of Holstein, belonging to Denmark, some parts of Holland, some of the French departments on the Rhine, and all the states of the new confederation of the Rhine, with the formation of which it left its existence as an empire.

**Vol. XVI.**

In ancient times Germany was inhabited by various nations, which the Romans, with whom they waged war for some centuries, considered as Gauls. Of the Helvetii, Boii, Teutonii, and Goths (see Goths, &c.), and the Teutones, who dwelt in the Sinus Godanus near the Cimbri, were among the first that crossed the Rhine, and applied to themselves the name of Germani, probably from the Teutonic word Gete or Guere, a word, affording, as it were, their quality of warriors. The word Guerra, Guerre in the Italian and French, which is not of Latin origin, appears to confirm this etymology. (See the history of the ancient Germans in the sequel of this article.) It is also from the Teutones that, in the German language, the country is called Teutschland, and latterly Deutschland. (See Teutones.) The French gave it the name of Allemacque from the Alemani, one of the German nations. (See Alemani.)

In the middle age the northern and north-eastern regions of Germany got an accession of population from the Vandals and Slavonians; and towards the end of the seventeenth century, some parts of Germany received an inconsiderable increase of inhabitants, by some thousands of French protestant refugees, who left France after the revocation of the edit of Nantes.

Buching flated the extent of Germany at 11,124 German square miles, 15 to a degree; but professor Crome of Gießen, including Silesia, states it at 12,796 German square miles, and its circumference at 500 German miles.

Germany is bounded on the north by the river Elbe, and the canal of Holstein, which separate it from Denmark, and by the Baltic sea; on the east by Prussia, Poland, Hungary, Slavonia, and Croatia; on the south by the gulf of Venice, Italy, and Switzerland; and on the west by the Rhine and the North sea.

Maximilian, grandfather to Charles V., divided Germany into ten circles, and this division was confirmed in the diet of Nuremberg in 1552; but the circle of Burgundy, which contained the fifteen provinces of the Low Countries, having been detached from the empire, it latterly contained only nine circles, &c.

I. The Circle of Aüfeln, which comprised 1. the archduchy of Austria proper; 2. the duchy of Styria; 3. the duchy of Carinthia; 4. the duchy of Carniola; 5. the Austrian Frioul; 6. the Littorale, or the territories of Trias and Fiume; 7. the county of Tyrol; 8. Upper Austria; 9. the bishopric of Trent; 10. the bishopric of Brixen; 11. the commanderies of the Teutonic order in Austria, and on the Estch; and 12. the lordship of Tràfo, belonging to the prince of Dietrichstein.

II. The Circle of Westphalia, which comprised 1. the bishopric of Minden; 2. the bishopric of Osnabrück; 3. the bishopric of Paderborn; 4. the bishopric of Liege; 5. the archduchy of Upper Austria; 6. that of Stablo and Mainz; 7. that of Werden; 8. that of Cornelius Minden; 9. that of Essen; 10. that of Thorn; 11. that of Hervorden; 12. the duchy of Cleves; 13. the duchy of Juliers; 14. the duchy of Berg; 15. the principality of Minden; 16. the principality of Verden; 17. the principality of Nysen; 18. the principality of Eifel Freiland; 19. the principality of Moer; 20. the duchy of Oldenburg; 21. the county of Mark; 22. the county of Ravenberg; 23. the county of Schauenburg; 24. the county of Lippe; 25. the county of Sternberg, which now belongs to Lippe; 26. the county of Bentheim; 27. the county of Steinfurt; 28. the counties of Tecklenburg and Lingen; 29. the county of Huy; 30. the county of Duderloh; 31. the county of Wied; 32. the
II. The Circle of the Lower Rhine, or the electoral circle of the Rhine, which comprised, 1, the electorate of Mayence or Mentz: 2, the electorate of Trevize: 3, the electorate of Cologne: 4, the palatinate of the Rhine; 5, the principality of Arenberg; 6, the county of Lower Hessenburg; 7, the burggravate of Reineck; 8, the county or lordship of Bieleheim; 9, the commandery of the Teutonic order Clothende. The prince of Thurn and Taxis was a member of this circle, without having any territorial possessions in it.

IV. The Circle of the Upper Rhine, which comprised, 1, the bishopric of Worms; 2, the bishopric of Spire; 3, that of Strasbourg; 4, that of Bale or Basel; 5, that of Fulda; 6, the principality of Heltterheim; 7, that of Reichenau; 8, the bishopric of Offenbach; 9, the landgrave of Heil; 10, the principality of Hersfeld; 11, the county of Katzeneben; 12, the county of Hanau-Münzenberg; 13, that of Hanau-Lichtenberg; 14, that of Hanau; 15, the principality of Simmer; 16, the principality of Lautern; 17, that of Veldents; 18, the principality of Deux Ponts; 19, the county of Sponeheim; 20, the principality of Salm; 21, the principality of Naillun; 22, the principality of Waldeck; 23, the county of Solms; 24, the county of Koenigstein; 25, the county of Hessenburg; 26, the possession of the Wald or Woud, or Rau Gravez and Rhine Gravez; in Latin, Comites Saltuarii, Forstarii, Silvestres et Hirsuti; counts of Grumbach, Stein, and Dhaun; 27, the county of Leinington; 28, the county of Wittgenstein; 29, the county of Falkenstein; 30, that of Kirchigen; 31, that of Wartenburg; 32, the lordships of Retzenheim, Dachtil, and Olbrück; 33, the free imperial cities of Worms, Spire, Frankfort on the Main, Friedheim, and Weitzlar; 34, the imperial borough of Friedberg; 35, the imperial villages of Müntzfeld, Stobach, and Soden.

V. The Circle of Saalburg, which comprised, 1, the bishopric of Constance; 2, the bishopric of Augsburg; 3, the abbey of Elwangen; 4, the abbey of Kempen; 5, the duchy of Wirtemberg and Teck; 6, the margravate of Baden; 7, the principality of Hohenzollern; 8, the abbey of Liadar; 9, that of Buchau; 10, the principality of Furthenberg; 11, the county of Oettingen; 12, the principality of Klettgau; 13, the principality of Lichtenhein; 14, that of Friedberg-Scheuren; 15, the abbey of Salamancon; 16, the abbey of Weilburg; 17, that of Odheim; 18, that of Eichingen; 19, that of Yburg; 20, that of Ueberg; 21, that of Kaysersheim; 22, that of Regensburg; 23, that of Roth; 24, the abbey of Weilwies; 25, that of Schauenburg; 26, that of Marchtal; 27, the abbey of Peterhausen; 28, the abbey of Wettenhausen; 29, that of Zwesthal; 30, that of Gengenbach; 31, the abbey of Heggelbach; 32, that of Guttenbach; 33, that of Rottmünster; 34, the abbey of Eichstein; 35, that of Wirthwies; 36, the commandery of Alfeld; 37, the landgraviate of Stühlingen; 38, the landgraviate of Dürren; 39, the county of Truchheim-Waldenburg; 40, the county of Köningen; 41, that of Eberfeld; 42, that of Witter; 43, that of Hohen-ems; 44, that of Hohen-Geroldseck; 45, the county of Neipperg; 46, the county of Bondorf; 47, the lordships of Wielenburg, Haufen, Moerkirk, Tuttlingen, Ulm, Ettlingen, Reutlingen, Nördlingen, Halle, Ulm, Tübingen, Rotweil, Heilbronn, Günzburg, Memmungen, Ludau, Dinkelsbühl, Biberach, Ravensburg, Kempten, Kaufbeuren, Weil, Weingarten, Vins, Leutkirch, Wimpfen, Giengen, Pfullendorf, Buchhorn, Aalen, Bopingen, Buchau, Offenburg, Singen, Zell on the Hammerbach; 49, the imperial village of Alocshaußen.

VI. The Circle of Bavaria, which comprised, 1, the archbishopric of Salzburg; 2, the bishopric of Freyningen; 3, the bishopric of Ratibor; 4, the bishopric of Pfaffm; 5, the principality of Berchtesgaden; 6, the abbey of St. Emmeram in Ratibor; 7, and those of Lower; and 8, of Upper Münster in the same place; 9, the city of Bavaria; 10, the Upper Palatinate; 11, the principality of Neuburg; 12, the principality of Sultzbacht; 13, the landgraviate of Leuchtenberg; 14, the principality of Stellinm; 15, the county of Hagen; 16, the county of Linsm; 17, the lordships of Erthen, Salzburg, Pyrbaum, Hohenwalde and Breitenau; 18, the free imperial city of Ratibor.

VII. The Circle of Franconia, which comprised, 1, the bishopric of Bamberg; 2, the bishopric of Wurzburg; 3, the bishopric of Eisfeld; 4, the commandery of the Teutonic order of Mergenthal; 5, the principality of Calvin, or Bayreuth; 6, the principality of Osnabrick, or Osnabuck; 7, the county of Henneberg; 8, that of Schwartzburg; 9, the principality of Hohenlohe; 10, the county of Cau; 11, the county of Wurttemberg; 12, that of Reichsburg; 13, that of Erfbach; 14, the lordships of Limburg, Schinium, Reichshilberk, Weilheim, Wurzburg, and Haufen; 15, the free imperial cities of Nuremberg, Rothenburg, Windheim, Schweinfurt, and Würzburg; 16, the imperial villages of Gochheim and Sannfeld.

VIII. The Circle of Upper Saxony, which comprised, 1, the duchy of Pomerania; 2, the electorate of Brandenburg; 3, the bishopric of Saxony; 4, the duchy of Saxony; 5, the duchy of Saxony-Coburg; 7, that of Saxe-Meiningen; 8, that of Saxe-Hildburghaußen; 9, the abbey of Hildesheim; 10, the abbey of Naumburg-Zeitz; 11, the principality of Altenburg; 12, the principality of Querfurt; 13, the principality of Anhalt; 14, the abbey of Quedlinburg; 15, the abbey of Weilenburg; 16, the principality of Schwartzburg; 17, the county of Mansfeld; 18, the county of Stollberg and Wernigerode; 19, the county of Barby; 20, that of Hohnstein; 21, the principality of Hatzfeld; 22, the county of Reuß; 23, the county of Schouenburg.

IX. The Circle of Lower Saxony, which comprised, 1, the bishopric of Hildesheim; 2, that of Lubeck; 3, the abbey of Gardener; 4, the duchy of Magdeburg; 5, the principality of Halberstadt; 6, the duchy of Bremer; 7, the principality of Celle; 8, the principality of Gifhorn; 9, the principality of Calenberg; 10, the duchy of Saxe-Lauenburg; 11, the duchy of Wolfenbüttel; 12, the principality of Blankenburg; 13, the duchy of Holstein; 14, the duchy of Mecklenburg; 15, the
the principality of Schwedt; 16, the principality of Ratzeburg; 17, the county of Ranzau; 18, the free imperial cities of Lubbeck, Goflar, Mulhhausen, Northhausen, Hamburg, and Bremen.

The following countries, without forming part of any of the nine circles, were likewise considered as belonging to the German empire: viz. 1, the kingdom of Bohemia; 2, the margraviate of Moravia; 3, the margraviate of Upper Lusatia; 4, that of Lower Lusatia; 5, the duky of Silesia; 6, the county of Montebellard; 7, the three circles of the immediate kingdoms of the Empire, in Swabia, Franconia, and on the Rhine; 8, the lordships of Mecklenburg and Waffenburg, the convent of Schontal, the margraviate of Freudenberg, the barony of Horfgen, the abbey of Cappenberg, that of Ellen, the lordship of Rheda, the abbey of Burichfeld, the lordship of Jever, the barony of Kniphausen, the lordships of Dyk, Mecherinck, Schonau, Wyler, Richold, Stein, Dreyfs, Landikron, Rhade, Saffenbourg, Schaumburg, Oberlein, the county of Homburgh, and the barony of Schauen. The German empire had also several fiefs in Italy.

The climate and temperature of Germany must, in general, be acknowledged to be temperate, yet it is considerably milder in the south than in the northern parts, where the winter is sometimes extremely severe, and of long duration. The air, however, is everywhere serene and healthy, except in a few low marshy places towards the North Sea. The vine thrives, and yields excellent wine, in all the southern parts. The falsify of the climate may likewise be inferred from the longevity of the inhabitants, some of whom arrive to a very great age.

There is perhaps no country in Europe, in which the summer varies more than in Germany. Sandy plains and barren heaths predominate in the north, and swamps and marshes in the north-west; but some of the interior and southern parts have an uncommonly fertile soil, and great attention is generally paid to its improvement. The south and the south-east side is the most mountainous. Bohemia is separated from Silesia by the Riefen Geburgh, or the Giant's mountains; towards Hungary are the Carpathian mountains, towards Italy the Alps. In the interior parts are the Schwarzwald, (black forest,) the Rauhe Alb, the Erzgebirge, the Fichtelgebirge, the Harz, or Hercynian forest, whose highest summit, the Brocken, is only 3,580 feet above the level of the Mediterranean sea. In ancient times Germany was covered with forests, chiefly of oak, birch, pine, fir, larch, and ash trees. Though they have been considerably thinned, and immense tracts of them converted into tillage, there are yet some very large woods, as the Speisart, the Schwartzwald, the Hartzwald, and the Thuringerwald.

The extent of sea-coal on the North sea is not much above 150 English miles, and on the Baltic about 500 English miles. The principal lakes are the Boden see, or lake of Constance, in Swabia, which forms one of the boundaries towards Switzerland; the Chiem see, in Bavaria; the Greitzer see, in Austria; the lakes of Dam, Neuwarp, Maudie, and Wilm, in Pomerania;those of Werbelin, Uckersee, Partleinn, Schwieluch and Ruppin, in Brandenburg; the Dammer see, in the county of Diepholts, besides several smaller ones in Mecklenburg and other parts of the country.

But it is chiefly the great number of rivers, by which Germany is intersected in various directions, that give it immense advantages for trade. It counts five hundred and twenty rivers in all; sixty navigable to a great length, and fix, viz., the Danube, the Rhine, the Mayne, the Weser, the Elbe, and the Oder, ranking among the largest and most noble rivers of Europe. The number of mineral springs and baths exceeds one thousand; the most famous are Carlsbad and Egra, in Bohemia; Warnbrunn, in Silezia; Toplitz, in Austria; Hellbronn, in Bavaria; Witten and Seltzer, in the circle of the Upper Rhine; Freyenwalde, in Brandenburg; Dobberson, in Mecklenburg; Lauchte, in Saxony; and Pyrmont, in Welfphalia.

As almost all climates, or at least all temperatures and soils, are to be met with in Germany, it abounds in almost all productions of nature and their varieties, and chiefly in all kinds of corn: fleck of excellent quality, hemp, hops, tobacco, madders, saffron, rape-seed, rhubarb, excellent garden vegetables and orchard fruits; wine, in greatest perfection on the banks of the Rhine, Mayne, Mofelle, and Neckar. The agriculture of Germany has been considerably improved of late by the efforts of Mr. Thaer and other patriotic writers. In the rearing of cattle and sheep Germany is, however, greatly deficient. The breed of horses, except in Mecklenburg, East Frieland, Oldenburg, Holstein, and some parts of Hanover and Wirttemberg, is very indifferent. The number of oxen is not sufficient either for agricultural purposes or for consumption. The heft breed is in East Frieland, Oldenburg, and Holstein. The number of sheep does not exceed thirteen or fourteen millions. The Spanish breed has been naturalized in some parts of the Prussian and Saxon dominions. The breed of hogs is much neglected; that of goats is encouraged in the mountainous parts, where they also rear ales and mules. The forests are staked with wild boars, stag, deer, and hares. Poultry is abundant. Salted and smoked geese, and goose quills, are exported from Mecklenburg and Pomerania. Some parts of Germany are remarkable for fine larks and thrushes, of a delicious flavour. Others abound with finning birds, particularly Canary birds and goldfinches, which are exported to almost every country of Europe. Bees are least attended to than in ancient times. Silkworms are reared with particular care in some of the southern, and even northern districts.

Of the mineral productions of Germany, gold forms the most inconsiderable part, small particles of it are found in the Rhine, the Danube, the Elbe, and the Sake. Silver is plentiful; its annual produce exceeds 200,000 marks, that of copper amounts to 100,000 cwts. The supply of tin from the mines is sufficient for home consumption. Iron of a very good quality, lead, quicksilver, cobalt, and antimon, and zinc are in great abundance. Brubbles, topazes, amethysts, cornelians, agate, serpentine, and other rare stones, Germany has large quarries of curious marble, and capital mill and barn stones. It abounds with various sorts of fine earth, such as triopk, and porcelain earth, chiefly in the circle of Main in the kingdom of Saxony; terra sigillata, potters' clay, fuller's earth, and others. There are some coal mines, particularly in Welfphalia, and abundance of peat moss. Salt is obtained in seventy-six salt works, of which those near Halle, in the former duchy of Magdeburg, produce the greatest quantity. There is no rock salt in Germany.

The principal manufactures of Germany are those of linen and woollen cloth, cotton, thread lace, china, hardware inferior to none but the English, glass, tobacco and snuff, writing paper, soap, wax, toys and trinkets, and silks, but not equal to the French. Manufacturers flourish most in the Austrian and Prussian dominions, in Saxony, in the present kingdom of Welfphalia, in the grand duchy of Berg, &c.

The towns most remarkable for extensive manufactures are Altona, Augsburg, Berlin, Brunswick, Bremen, Caffel, Chemnitz.

Situated almost in the centre of Europe, bounded by the Baltic and North sea, and interfaced by many large rivers, Germany has enjoyed, till very lately, a most extensive commerce. Its principal sea ports are Hamburgh, Altona, Kiel, Lubeck, Wilmar, Rostock, Straflund, Stettin, Emden, Bremen. Inland towns of great trade are Bronfick, Magdeburg, Leipzig, Naumburg, Francfort on the Mayne, and Francfort on the Oder, Vienna, Augsburg, Nurnberg, Delfau, and Ulm. The principal articles of exportation are timber, corn, fruit, wine, tobacco, madders, cobalt, fennels, potash, horse, oxen, salt and seasoned meat, butter, cheese, honey, wax, leather, wool, cotton yarn, linen cloth to the amount of six millions sterling, Linen yarn, thread lace, cotton stuffs, hardware, lead, copper, brass, quicksilver, china, earthen-ware, mirrors, glass, wooden toys and trinkets, &c. Germany imports corn, oxen, and horses chiefly from Hungary, Poland, and Denmark, hogs from Hungary, butter from Ireland and Holland, silk and cotton, all sorts of colonial produce, wine and fruit, silk and cotton stuffs, paper, jewellery and trinkets. It carries on a most important trade with European Turkey, from whence it gets by land as far as Semlin, and from thence upon the Danube by way of Vienna, an immense quantity of raw cotton, which is distributed all over the north of Europe, Germany and Switzerland. As it has to pay annually from three to four millions of piasters in hard cash to the Turks, these money transfections are carried on by means of the bankers of Vienna. The principal insurance companies are at Hamburgh, Lubeck, and Bremen. Weights, measures, and coins differed in every petty principality of Germany, and this circumstance was one of the disadvantages which travellers at least experienced from that number of free cities and small states for which Germany was particularly remarkable. It is true, as has been justly observed by the intelligent author of an essay on the Reformation of Luther, that all these cities and principalities of moderate extent had their principle of life active, peculiar, and independent. Each prided itself on making industry, sciences and arts flourish in its little capital.

By the treaties of Paffau in 1555, of Augsburg in 1555, and of Muncther in 1648, the Roman Catholic, Lutheran, and reformed religion, were acknowledged as dominant in Germany: but all other sects enjoyed a complete toleration, and the number of Jews in some parts is very considerable.

According to Mr. Charles Villier's view of the present state of ancient literature and history in Germany, in his report to the third class of the French institute, the German literati possess a great facility in entering into the spirit of nations and of ages, different from those of the present day, and are eminently successful in archeological researches, and in the interpretation and translation of the ancient, particularly of the Greeks, perhaps on account of some secret affinity between the two nations, as the analogy of the two languages seems to indicate. But if any species of literary production can be said to belong to Germany, almost exclusively, it is the history of literature. The German literary and critical journals, especially those published at Jena, Halle, Leipzig, and Gottingen, rank among the best in Europe. Before the revolutionary wars, the number of authors exceeded 14000. Their literary productions found a ready market at the two fairs of Leipzick in the spring and autumn of every year. The number of new books published at those fairs was rarely under 4000: but since the fall of Prussia, in 1307, it has never exceeded 1500. Two hundred German, and about thirty foreign bookellers, used to meet at Leipzick, to barter their respective publications; the amount of these exchanges was generally above 200,000, sterling. Anciently German authors wrote most of their works in Latin. In the beginning of the seventeenth century, there were at least 400 out of 700 written in that language; towards the end of the eighteenth century the proportion was only 200 in 1800. Before that period the literary labours of the Germans were confined to theology, jurisprudence, and biblical and classical criticism: but during the latter half of the last century they have been extended to every branch of science and literature; mineralogy, natural history in general, chemistry, alchemy, and geometry have been cultivated with an intelligent ardour and perseverance that have been rewarded with many brilliant discoveries. Statitics, which elucidates the theoretical tenets of political economy, and furnishes important materials to the historian and the geographer, is indebted alike for its origin and its improvement to the literary industry of the Germans. In metaphysics they have incurred the reproach of dogmatical obscurity, and in their dramas and novels they are justly accused of a disfiguring affectation of morbid sentimentality. But their epic and tragic poets, and their moral philosophers, have immortalized themselves by works, which have been eagerly translated into all the idioms of modern Europe. To the great names of Luther, Kepler, Leibnitz, Haller, Euler, Moelhe, Pufendorff, Pott, Maggraff, Hagedorn, Leffing, Gleim, Kleit, Heyne, Rebener, Klopotock, Ramler, Gellner, who live in the records of literary fame, must be added those of Bernouilli, Lambert, Keitner, Wieland, Schiller, Goethe, Herder, Zolliker, Spalding, Bloch, Moses Mendelssohn, Klaproth, von Humboldt, Volf, Holty, Michaelis, J. A. Eberhard, Von Zach, and many others, whose merits are as conspicuous as they are generally acknowledged.

The German language is of Teutonic origin, and may be regarded as a primitive one, as it is the mother tongue of the Dutch, Flemish, Danish, Swedish, and English languages. Its dominion extends from the boundaries of Lapland and Finland, to those of France and Italy. In the middle ages, the similarity between the idioms derived from the German was great, that the German and English missionaries that went to Sweden, Denmark, and Norway, had no difficulty in making themselves understood in those countries. The learned Thre, in his introduction to his Sueo-Gothic Glossary, has also discovered a striking conformity between the old Teutonic and Perman languages. That which it bears to the Greek in its construction is not less striking. The dialect known by the name of Low German, or Low Dutch, is now diffused in writing, and wholly confined to the vulgar in the kingdom of Belgium, in the duchies of Mecklenburgh and Holstein, and in Pomerania; it comes very near the Dutch. The High German, or High Dutch, has been considerably improved since Luther's time; it is remarkable for strength, richness, bold inversions, and compound words, which render it admirably fit for the higher strains of epic poetry. The learned dictionaries of Adelung, Eberhard, and Campe, have served to elucidate the meaning of every one of its terms, so that it may now be considered as fixed. It is spoken in its greatest purity in Upper Saxony, part of Lower Saxony, and on the banks of the Neckar and the Mayne. There are still some traces of the Slavonian language left on the shores of the Baltic, in some districts of Pomerania, in Silefia, Bohemia, and Moravia; but it is disappearing very fast.
No country can boast of more and better institutions for the acquisition of knowledge and science than Germany. Notwithstanding the great extent of territory ceded to France, there are still 30 universities, of which 17 are Protestant, 11 Catholic, and two mixed, viz. ; Griesswalde, Jens, Leipzick, Wittenberg, Gottingen, Halle, Helmildt, Kiel, Rothen, Aider, Erlangen, Rinteln, Gießen, Marburg, Stuttgart, Tubingen, Frankfurt on the Oder, are Protestant universities; Bamberg, Witzburg, Paderborn, Fulda, Dillingen, Freyburg, Infruck, Vienna, Ingollstadt, Saltzburgh, and Prague, are Catholic universities; and the two mixed ones are Erfurt and Heidelberg. The oldest of them is that of Prague, which was founded in 1348, and the most modern that of Erlangen, founded in 1743. Most of these learned seminaries, which have furnished the northern regions of Europe with able teachers, are provided with extensive libraries, anatomical theatres, museums of natural history, botanical gardens, and astronomical observatories. The professors are animated with the noble ambition of extending the fame of the university in which they teach by their writings, and as the students pay a liberal fee for their board and lodgings, the professors have a useful function among the teachers. Every student is at liberty to select what lectures he chooses to hear, and may employ his time as he likes. He has only a severe examination to undergo when he offers himself as a candidate for any situation in the law, administration, or church, or when he wants to take his degree as a doctor in medicine, without which degree he cannot be admitted into any college of physicians. All the other useless scholastic formalities have long since been abrogated.

Besides these universities there is a great number of public or free grammar schools, lyceums, and other learned schools in Germany. The methods of teaching have been considerably improved within the latter half of the eighteenth century, when Baderow, profiting by the hints thrown out by J. J. Rousseau, opened the Philanthropinum at Détain, and set an example of liberal and scientific education, which was soon imitated by men of enlightened views and extensive information. Campe, Valleine, Saltzmann, Trapp, and latterly Pellelozzi, have eminently contributed to introduce better modes of instruction. There are also many establishments defined to train young men for particular employments, such as military, mineral, commercial, and even agricultural schools. Females are mostly educated at home under the eyes of their mothers, who are particularly anxious to guard their daughters against the baneful influence of ladies boarding schools.

The numerous literary societies of all kinds, public libraries, reading clubs, circulating libraries, critical journals, and other means of disseminating and preferring knowledge, afford another proof of the high state of civilization to which most countries of Germany are arrived. The most distinguished of its learned societies are the imperial academy of natural philosophy at Vienna, the royal academy at Berlin, the academies at Cœfl, Erfurt, Gottingen, Mainz, Munich, Cæstit, and Zella. The best public libraries are those of Berlin, Dresden, Gottingen, Gotha, Hanover, Leipzick, Mainz, Munich, Stuttgart, Weimar, Vienna, and Wittenbac. Though Germany may boast of being the cradle of the art of printing, England and France bear the palm. The generality of German books are printed without title, with had types, and on had paper. A few splendid editions have, however, been attempted at Leipzick, and met with merited success. The liberty of the press, which was never general all over Germany, has received its death-blow from the fiery which the French government exercised in every one of its counties, since the peace of Tilsit.

Of the fine arts, music is that in which the Germans excel. They vie with the Italians, and the names of Handel, Bach, Haydn, and Mozart are reverenced by their rivals. Germany has also produced some good painters and engravers, but few statuaries and architects. With respect to dancing, it is far behind Italy and France. The principal academies for the encouragement of the fine arts are at Berlin, Dresden, Leipzick, Mainz, and Vienna. The most celebrated galleries of pictures are at Dresden, Vienna, Sans Souci, near Potsdam, Duffeldoff, Mannheim, and Cæsæl.

The influence of the arts on the manners of a people is of no more striking than in Germany, where concerts and musical parties, together with dancing, form the chief amusement; and the manners of the middle orders are polite and amiable.

Before the peace of Utrecht in 1801, the population of Germany was rated at 27 millions of inhabitants; but as it fell 57000000 individuals, through the cession of the countries situated on the left shore of the Rhine, its present population is very little above 23 millions.

The history of Germany in its ancient state, its gradual advancement towards extent of territory and dominion, and its recent decline and fall, presents to our notice a subject that is in a variety of respects peculiarly interesting. The western monarchy of Rome was first refounded, then invaded, and at length overturned by the warlike inhabitants of Germany; and it was from the woods of this country that the most civilized nations of Europe issued; and we may still distinguish in the rude institutions of these barbarians the original principles of our laws and manners. Ancient Germany, excluding from its independent limits the provinces westward of the Rhine which had submitted to the Roman yoke, extended itself over a third part of Europe. Almost the whole of modern Germany, Denmark, Norway, Sweden, Prussia, Austria, and the greater part of Poland, were peopled by the various tribes of one great nation, whose composition, manners, and language deviated a common origin, and preferred a striking resemblance. On the west, ancient Germany was divided by the Rhine from the Gallic and the east by the Danube, from the Illyrian provinces of the empire. A ridge of hills, rising from the Danube, and called the Carpathian mountains, covered Germany on the side of Dacia or Hungary. The eastern frontier was faintly marked by the mutual fears of the Germans and the Sarmatians, and was often confounded by the mixture of warriors, and confederating tribes of the two nations. Such was also the case with respect to the Gauls on the west, where it is still more difficult to fix their boundaries on account of their constant fluctuation. In the remote darkness of the north, the ancients imperfectly deferred a frozen ocean, that lay beyond the Baltic seas, and beyond the peninsula, or islands of Sarmatia. But their nearest northern limit was the Hercynian forest, at that time supposed to be impenetrable. It appears from authentic documents that the climate of ancient Germany was much colder than that of the country in its more modern state. For the evidence of this fact, and the explication of it, we refer to the article Climate, where the reader will also find some reflections on the influence which variety of climates is supposed to have on the minds and bodies of the different inhabitants of the globe. The keen air of Germany contributed, without doubt, towards forming the large and masculine limbs of the natives, who were, in general, of a more lofty stature than the people of the south, gave them a kind of strength better adapted to violent exertions than to patient labour, and inspired them with
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with constitutional bravery, which is the result of nerves and spirits. " In hos artus, (fays Tacitus, Germania, iii. 20.) in hae corpora, quae miramur, excrecutem." The fatigue of a winter campaign, that chilled the courage of the Roman troops, was feebly felt by those hardy children of the north, who, in their turn, were unable to reft the thinner heats, and dissolved away in languor and sickness, under the beams of an Italian sun.

As to the origin of the Germans, although we cannot allow with Tacitus, that they were "Indigenes," or natives of the soil, yet we must admit that ancient Germany was not peopled by any foreign colonies, already formed into a political society; but the name and nation received their existence, as we have already observed in the beginning of this article, from the gradual union of some wandering barbarians, probably of the same nation with the Celtae and Gauls, and both, perhaps, descended from the ancient Gomerians, or descendants of Gomer, the elder son of Japhet. (See Division of Mankind.) The Germans, however, were very much intermixed with the old Scythians and Sarmatians, on that side which joined their territories, and particularly between the two great rivers, Rhine and Danube; and they, without doubt, had adopted many of their customs, as well as intermingled some portion of their language with their own; but in all other parts of Germany, we find such an exact conformity in their religion, laws, customs and language, as affords a very strong presumption that they were descended from the same ancient stock with the Celtae or Gauls, and that they came by gradual and successive migrations from Asia. (See Celta.) How this country came to be denominated Germany, and whence its inhabitants derived the appellation of Germans, it is not easy to determine. The most probable conjecture is, that they were so called, either from their affinity to the Celts, or from the Celtic words "gar man," a warlike man; but this was not their original name, any more than the appellations of "Teutones" or "Alamanni," by which, as we have already observed, they were occasionally denominated. This name was of a more modern date, and seems to have had its rise on the other side of the Rhine, when the Condurfs, Eburones, Cenomani, and Parlemi, crossed that river, after the example of some others of their countrymen, and settled in Gaul. Thence, it seems, were the first to whom the appellation of Germans was given, and which, therefore, extended no farther than the Rhenish shore on the Gallic side, but soon after passed over to the other, and became common to other people of the same language and customs, till at length it became the general name of the whole nation, and the country was called from them Germania or Germany.

Whatever may be supposed to be the remote origin of the Germans, they appear to have been in a savage and uncivilized state on their first settlement in this country. The account given of the country itself by Caesar and Tacitus is so unfavourable, that it seems to be almost incredible, that a brave nation, for such we must allow the ancient Germans to have been, would have been contented to remain in it, when they were deficient of neither strength nor courage to have forced their way into others more pleasant and fruitful. The ancient barbarians describe it as wholly barren and uncultivated; and even its variety of soil and climate added to the horror of it, from the dreadful forests, putrid and insalubrious bogs, the inclemency of its winds, dampness of its seas, lakes, and rivers, and sterility of its soil. The uncivilized state of the ancient Germans may be inferred from the account given of them by Tacitus; for in his time they were unacquainted with the use of letters (German, ii. 15); and the use of letters is the principal circumstance that distinguishes a civilized people from a herd of savages incapable of knowledge or reflection.

Of the useful and agreeable arts of life the ancient Germans were wretchedly destitute. Modern Germany is said to contain about 2,500 walled towns, whereas, in a much wider extent of country, the geographer Ptolomy could discover no more than ninety places, which he decorates with the name of cities, though, according to our ideas, they would not deserve that splendid title. We can only suppose them to have been rude fortifications, constructed in the centre of the woods, and designed to secure the women, children, and cattle, whilst the warriors of the tribe marched out to repel a sudden invasion. Such is the account given of them by Caesar; and Tacitus afferts that the ancient Germans had no cities. Even in their hamlets or villages they did not build their houses contiguous to each other. They considered it as a badge of servitude to be obliged to dwell in a city surrounded with walls. Each barbarian fixed his independent dwelling on the spot to which a plain, a wood, or a stream of fresh water had induced him to give the preference. Neither stone, nor brick, nor tile, were employed in these first habitations. They were, indeed, no more than low huts of a circular figure, built of rough timber, thatched with straw, and pierced at the top to leave a free passage for the smoke. That they considered cities as places of confinement rather than of security, appears from the following circumstance: when one of their tribes had shaken off the Roman yoke, their countrymen required of them, as an evidence of their having recovered liberty, to demolish the walls of the towns which the Romans had built in their country. The Romans built several cities of note on the banks of the Rhine. But in all the vall countries from that river to the coasts of the Baltic, there was hardly one city previous to the ninth century of the Christian era.

In the most inclement winter, the hardy German was satisfied with a scanty garment made of the skin of some animal. The natives, who dwelt towards the north, clothed themselves with furs; and the women manufactured for their own use a coarse kind of linen. The game of various sorts, with which the forests of Germany were plentifully studded, supplied its inhabitants with food and exorcised. Their plentiful herds of cattle, left remarkable for their beauty than for their utility, formed the principal article of their wealth. A small quantity of corn was the only produce exacted from the earth. The use of orchards, or artificer meadows, was unknown to the Germans; nor can we expect any improvements in agriculture from a people, whose property every year experienced a general change by a new division of the arable lands, and who, in that strange operation, avoided disputes, by suffering a great part of their territory to lie waste and without tillage. Gold, silver, and iron, were extremely scarce in Germany. Its barbarous inhabitants wanted both skill and patience to investigate those rich veins of silver, which have since liberally rewarded the attention of the princes of Brunswick and Saxony. Although the various transactions of peace and war had introduced some Roman coins (chiefly silver) among the barbarians of the Rhine and Danube; yet the more distant tribes were absolutely unacquainted with the use of money, carried on their limited traffic by the exchange of commodities, and prized their rude carthens, vessels as of equal value with the silver vases, the presents of Rome to their princes and ambassadors. If we contemplate a savage nation in any part of the globe, a supine indolence and a carelessfruhs of futurity will be found to constitute their general character. This was decidedly the case with respect to the ancient Germans. The care of the house and family, the management
of the land and cattle, were delegated to the old and infirm, to women and slaves. The lazy warrior, delitute of every art that might employ his leisure hours, confined his days and nights in the annual gratifications of sleep and food. Nevertheless, the found that summoned the German to arms was grateful to his ear. It riled him from his uncomfortable lethargy, gave him an active pursuit, and, by strong exercise of the body, and violent emotions of the mind, restored him to a more lively sense of his existence. In the dull intervals of peace, these barbarians were immediately addicted to deep gaming and excessive drinking; both of which, by different means, the one by inflaming their passions, the other by extinguishing their reason, alike relieved them from the pain of thinking. They gloried in passing whole days and nights at table; and the blood of friends and relations often stained their numerous and drunken assemblies. The poftition and the enjoyment of property are the pledges which bind a civilized people to an improved country. But the Germans, who carried with them what they mott valued, their arms, their cattle, and their women, cheerfully abandoned the vain illusion of their woods for the unbounded hopes of plunder and conquest. The innumerable swarms that swelled, or seemed to swell, from the great store-house of nations, were multiplied by the fears of the vanquished and by the credulity of succeeding ages. And from facts thus established, and facts gradually embellished, and has been supported by writers of distinguished reputation, that in the age of Caesar and Tacitus the inhabitants of the north were far more numerous than they are in our days. On this subject sir William Temple and Monetfquieu have indulged the usual livelinet of their fancy. A more serious inquiry into the causes of population, seems to have convinced modern philosophers of the falsehood, and indeed the impossibility, of the supposition. To the names of Mariana and of Machiavel, we can oppose the equal names of Robertson and Hume.

A warlike nation like the Germans, without cities, letters, arts, or money, found some compensation for this savage state in the enjoyment of liberty. Their poverty secured their freedom, since, says Gibbon, our defires and our poffessions are the strongest fetters of despotism. Caesar and Tacitus inform us, that the state of society among the ancient Germans was of the rudest and most simple form. They lived entirely by hunting or pastoral. They neglected agriculture, as we have already seen; their chief food was milk, cheese, and flesh. While seventy remains in this simple state, men, by uniting together, leisurely relinquishing any portion of their natural independence. The authority of civil government was extremely limited among the Germans. In times of peace they had no common or fixed magistrate; but the chief men of every district dispensed justice and accommodated differences. In the far greater part of Germany, the form of government was a democracy, tempered indeed, and controlled, not so much by general and positive laws, as by the occasional ascendant of birth and valour, of eloquence and oration. Some tribes, however, on the coast of the Baltic, acknowledged the rights of kings; but their kings had not absolute or unbounded power; their authority consisted rather in the privilege of advising than in the power of commanding. Matters of small consequence were determined by the chief men; affairs of importance, by the whole community. As soon as a youth, born of free parents, had attained the age of manhood, he was introduced into the general council of his countrymen, solemnly invested with a shield and a spear, and adopted as an equal and worthy member of the military commonwealth. The assembly of the tribe was convened at stated seasons, or on sudden emergencies. The trial of public offences, the election of magistrates, and the great business of peace and war, were determined by its independent voices. Sometimes these important questions were previously confidered, and prepared in a more select council of the principal chieftains. The magistrates might deliberate and persuade; the people only could resolve and execute. When timid, though just and prudent, counsels were proposed, they expressed their dislike by a hollow murmur. But whenever a popular orator proposed to vindicate the means of citizen from either foreign or domestic injury, whenever he called upon his fellow-countrymen to assist the national honour, or to pursue some enterprise full of danger and glory, a loud clashing of shields and spears expressed the eager applause of the assembly; for the Germans always met in arms. On occasions of danger a general of the tribe was elected; and in circumstances of preying and extensive danger, several tribes concurred in the choice of the same general. The bravest warrior was named to lead his countrymen into the field, by his example rather than his commands. His power expired with the war, and in time of peace the German tribes acknowledged not any supreme chief. Princes were, however, appointed, in the general assembly, to administer justice, or to conduct differences (among the officers, Cafer) in their respective districts. To the choice of these magistrates, birth was regarded as much as merit. To each was assigned, by the public, a guard, and a council of 100 persons; and the heir of the princes appears to have enjoyed a pre-eminence of rank and honour, which sometimes tempted the Romans to compliment him with the regal title. The Germans respected only those duties which they imposed on themselves. The most obscure soldier refilled with disdain the authority of the magistrates. Every individual among the ancient Germans was left at liberty to choose whether he would take part in any military enterprise which was proposed; it became, of consequence, the great object of every person, who aimed at being a leader, to gain adherents and to attract them to his person and intiret. Caesar calls these adherents Ambacti and Clients, i. e. retainers or clients. Tacitus calls them Comites, or companions. The chief distinction and power of the leaders confided in being attended by a numerous band of chosen youth. This was the cause of the great power and reputation of the emperors. The power of the leaders was absolute, and it was the duty of the subjects to support their power and to obey their orders. The leaders gained, or preferred, the favour of these retainers by presents of armour and of horses, or by the prof-use though inelegant hospitality with which they entertained them. But even after they united in society, the Germans circumferibled the criminal jurisdiction of the magistrate within very narrow limits, and exercised almost all the rights of private revenge and revenge. Their magistrates had the absolute disposal of the landed property within their district, and they distributed it every year according to a new division; but they had not the power of imposing, or of inflicting any corporal punishment on a private citizen. Every individual was obliged to avenge the wrongs which his parents or friends had sustained. Their enemies were hereditary, but not irreconcilable. Even murder was compensated by paying a certain number of cattle. A part of the fine went to the king or state, a part to the person who had been injured, or to his kindred. Chastity is not reckoned, without exception, to the wives of the ancient Germans. Polygamy was not in use, except among the princes, and among them only for the sake of multiplying their alliances. Divorces were prohibited by manners rather than by laws. Adulteries were punished as rare and inexcusable crimes; nor was seduction justified by example.
example and fashion. Tacitus evidently indulges an honest pleasure in the contrast of barbarian virtue with the dilatory conduct of the Roman gods; yet there are some striking circumstances that give an air of truth, at least of probability, to the conjugal faith and chastity of the Germans.

The German huts, open on every side to the eye of indiscretion or jealousy, were better safeguards of conjugal fidelity than the walls, the bolts, and the eunuchs of a Persian harem. Besides, the Germans treated their women with esteem and confidence, confined them on every occasion of importance, and fondly believed that in their breasts resided a faculty and wisdom more than human. Some of their interpreters of fate, such as Valleda, in the Batavian war, governed, in the name of the Deity, the nearest nations of Germany. The reft of the sex, without being adored as goddesses, were respected as the free and equal companions of soldiers; associated, even by the marriage ceremony, to a life of toil, of danger, and of glory. In their great invasions, the camps of the barbarians were filled with a multitude of women, who remained firm and undaunted amidst the found of arms, the various forms of destruction, and the honourable wounds of their sons and husbands. The women denounced death much less than servitude. If the day was irrecoverably lost they well knew how to deliver themselves and their children, with their own hands, from an inflicting victor. Heroines of such a cast may claim our admiration; but they were most assuredly neither lovely, nor very susceptible of love.

Conscious pride taught the German females to suppress every tender emotion that stood in competition with honour, and the first honour of the sex has ever been that of chastity.

The religious system of the Germans was dictated by their wants, their fears, and their ignorance. They adored the great visible objects and agents of nature, the sun and the moon, the fire and the earth; together with those imaginary deities who were suppos'd to predece the great part of the most important occupations of human life. They were perfused that by some ridiculous acts of divination, they could discover the will of the superior beings, and that human sacrifices were the most pious and acceptable offering on their altars. If there was any difference between the Gauls and Germans in point of religion, it consisted only in this, that the latter, being more fierce and untractable, were not only more tenacious of their superstitions rites, but likewise more cruel and inhuman in them. It appears, from the testimonies of Caesar, Tacitus, Dio, Suidas, Strabo, Athenaeus, and other ancient authors, that the Germans had no temples, but performed their religious rites in groves erected for that purpose, or in woods, forests, and defert places. Temples were not introduced in Germany till long after the Gauls had erected them; and the inferior divinities introduced among the Gauls, such as Jove or Jupiter, Mars, Apollo, Mercury, Venus, Diana, &c. were also adopted by the Germans, though some of them were represented under different names and attributes. Jupiter was worshipped under the name of Thor or Taran, &c. the Thunderer; this name was given by the Gauls to Mars; and the Germans bestowed it on their Odin or Woden; but the name of Jupiter was never adopted by the Gauls, nor by the Germans. Both Gauls and Germans agreed in worshipping the supreme deity under the name of I hust or Efhus, and under the emblem of an oak, which was consecrated to him. The goddesses Hertha was one of their ancient deities, and her idol was preserved in a wood or grove, "Calum neum," upon a covered seat, and the bad but one priest to pinnifer to her, who was the only person that was allowed to approach her. The worship of this goddess corresponded with that which the Romans and others paid to the "Earth," under the name of "MATER." A solemn procession was occasionally celebrated in the present countries of Mecklenburg and Pomerania. The unknown symbol of the "Earth," covered with a thick veil, was placed on a cartage drawn by cows; and in this manner the goddesses, whose common residence was in the isle of Rugen, visited several adjacent tribes of her worshippers. During her progress, the found of war was hushed, quarrels were suspended, arms laid aside, and the reftles Germans had an opportunity of tafting the blessings of peace and harmony. The "Truce of God," so often and so ineffectually proclaimed by the clergy of the 11th century, was an obvious imitation of this ancient custom.

The influence of religion on the minds of the ancient Germans was far more powerful to inflame than to moderate their fierce passions. The consecrated standards, long regarded, as trophies of superflity, were placed in the front of the battle; and the hostile army was devoted with dire exorcisms to the gods of war and of thunder. A brave man was the worthy favourite of their martial deities; and the wretch who had lost his shield was banished alike from the religious and the civil assemblies of his countrymen. Some tribes of the north seem to have embraced the doctrine of transmigration; others imagined a grofs paradise of immortal drunkenees. (See the Edda, fable 20.) All agreed, that a life spent in arms, and a glorious death in battle, were the best preparations for a happy futurity, either in this or in another world.

It is said that the Germans, as well as Gauls, were early taught by their Druids, as fundamental truths, an overruling providence, and the immortality of the soul; but the noble principles of religion and virtue were soon corrupted as irritments of divination and superstition. Caesar says, indeed, (Com. i. vi. c. 21.) that the Germans had no druids, as the Celts had; but Tacitus, who was better acquainted with the Germans, speaks frequently of their priests, who held office and authority, as he states them, were similar to those of the Gaulish druids, and they seem to have been of the same order of men, though perhaps they did not bear the fame name. As to the immortality promis'd by their priests, it was in some degree conferred by the bards, who by their military songs kindled in the breasts of their audience the enthusiasm of arms and glory. The view of arms and of danger heightened the effect of these songs; and the pations which they tended to excite, the desire of fame, and the contempt of death, were the habitual sentiments of a German mind. A contempt of danger and of death was one of the principles which they instilled into the minds of their youth, and a regard to which their priests inculcated as the furest means of reputation and wealth, and also of happiness in a future life. Under the influence of this principle their armies, which consisted more of infantry than cavalry, were easily rafed and maintained. Like the Gauls and Britons, the Germans fought in separate cantons or tribes; and thus they were induced to exert themselves with the greater firmness and vigour in defence of their relations, neighbours, and friends, and for the honour of their respective communities. We are told, indeed, that some of them, especially the Cimbri, formed their whole infantry into one square battalion, and placed their wives, children, and baggage behind a fence made of their wagons; and when they were prepared for an attack, a signal was given, which was re-echoed by an universal shout, and repeated till the engagement commenced. They used no art or stratagem in fighting, but wholly confided in a furious outlet
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out on the enemy, which they maintained with a deliberate
intrepidity till the day was won or lost: if they were once
thrown into disorder they seldom rallied, but became depe-
rate, and either fought till they were slaughtered, or
took themselves to flight; for it was reckoned inglorious to
yield themselves prisoners. The military weapons of the
cavalry among the Germans were shields and spears, which
they used in common with the foot, but the later had, be-
side their darts, bows and slings, and seldom had recourse
to their pikes and swords. Their arms were adorned with
their favourite furniture and chief ornament; so that they never
appeared in public without them. The sword was so favored,
that the most solemn and obligatory oaths were those which
they took upon a naked blade. Nor did they affect in any
solemn rite, without their sword, shield, or spear. They
then wore them at their familiar visits, banquets, and reli-
gious dances; and they were frequently to be seen or bur-
ried with them, when they died. The sports, games, and
exercitcs of the Germans, were of the masculine kind, and
such as invited them to the operations of war. It was a
long time before they acquired any knowledge of the liberal
arts, or even that of writing; and we are told, that Charles the
Great caused some of their barbarous poems, which they had been accustomed to sing from memory,
and which celebrated the illustrious actions of their ancient
kings and heroes, to be committed to writing for their use,
and in way of encouraging them to learn to read. The
Saxons, it is said, had such a contempt for letters, that they
refused to learn to read the gospels till they were put into
verse, and set to fuch tunes as they could easily sing. Even
their laws were not reduced to writing till about the 12th or
13th centuries.

The native disposition of the ancient Germans displayed
itself chiefly in their martial genius, and in their singular fide-
licity. In some cases their love of liberty, and hatred of ty-
ranny and oppression, precipitated them to acts of treachery
and even of murder; for in such cases they were easily in-
centcd, and extremely vindictive. On other occasions, Tar-
cetiae fay, they were noble, magnificent, and beneficent,
without ambition to aggrandize their dominions, or to invade
those from whom they received no injury; rather chufing to
employ their strength or valour defensively, than offensively;
to preferve their own, than to revenge their neighbours.
In their own houses, furniture and diet, they were distinguished
by their plainness and simplicity; but at the same time, they
were no less distinguished by their hospitality to strangers,
and by their readiness to succour those that were in distress.
Although in most of their customs the Germans very much
resembled the Gauls, yet, with regard to their funerals, they
were very different. The latter performed these obsequies
with pomp and profusion; whereas the Germans discharged
their last offices to the dead with plainness and simplicity;
the only grandeur they affected, was to burn the bodies of their
great men with some peculiar kinds of wood; and afterwards
they flung each man's armour into the funeral pile, and
sometimes his riding drefs. They then deposited their ashes
in urns, like the Gauls, Romans, and other nations. It may
be observed in general, that as the fuperstition for the dead,
the reverence made to them at their funerals, and the other superfluous rites performed on these occasions,
were all the result and the evidence of an established belief,
that the soul was immortal.

The ancient Germans were a brave and independent race
of men, and peculiarly distinguished by their love of liberty
and arms. They opposed the Roman power, after it had
arrived at maturity. After their contest with Caesar, who
was provoked by the Treviri to invade their country, and
their revolt against Augustus, which was suppressed by
Agrrippa, and the insurrection which commenced among the
Roman legions in Pannonia, quelled partly by Drusus, and
finally by Germanicus; their other more considerable wars
with the Romans were waged against the emperors M. Aure-
lius, Alexander, Maximian, Valerian, Aurelian, Probus,
Constantius, Julian, Valentinian, and some of his succeffors.
Some notice is taken of these conflicts under the names of the
Alemanni, Geretides, Franks, Suevi, Heruli, and Burg-
dundians. Their country was divided into a number of petty
foreigncities, independent of each other, though occasionally
connected by a military union, until it was reduced to the
condition of a Roman province; and when the Roman em-
pire was shattered by the Northern barbarians, Germany was
over-run by the Franks about the year 480; and continued in
subjection to chieftains of that nation, who governed over
the Saxons, Alemans, Frisians, Saxons, Thuringians, and
Bavarians, until the end of the eighth century, when Char-
lemagne united all Germany into one kingdom, as part of the
Frankish monarchy. The conquered German nations
had hereditary dukes of their own at first, and were govern-
ed by their own laws: but Charlemagne put an end to the
former, and governed the different German provinces by
counts and royal delegates, and in the year 800 he assumed
the title and dignity of emperor. But the empire of Char-
lemagne was a structure erected in fo short a time, that it
could not be of long duration. Under his immediate suc-
cceflor it began to totter, and soon after fell to pieces.
The crown of Germany was separated from that of France, and
the descendants of Charlemagne established two great mon-
archies, one at Rome, as to give rife to a perpetual rivalfhip
between them. But the princes of the race of Charlemagne,
who were placed on the Imperial throne, were not altogether
degenerate as thoee of the same family who reigned in
France. In the hands of the former, the royal authority re-
tained some vigour; the nobles of Germany, though poffef-
sed of extensive privileges and ample territories, did not fo early
attain independence. The great offices of the crown con-
tinued at the disposal of the sovereign, and during a long pe-
niod, they remained in their original state without becoming
hereditary in the families of the persons to whom they had
been granted.

At length, the German branch of the family of Char-
lemagne became extinct upon the death of Louis IV. His
foible descendants who reigned in France had funk into
fuch contempt, that the Germans, without looking
{229}towards them, excerciced the right inherent in a free people;
and in a general assembly of the nation at Worms, in the
year 911, offered the imperial crown to Otho, duke of Sax-
ony, who declined it on account of his great age, and recom-
{230}mended Conrad, count of Franconia. The latter was unani-
mously elected emperor. His reign was disturbed by the dif-
obedience of some nobles whom he subdued, and by the pre-
tenfions of Henry, fon of the duke of Saxony, his benefactor.
Their quarrels, however, did not prevent Conrad from ac-
knowledging the merit of that prince in the fame manner as
Otho had done his. He recommended Henry as the fittest
prince to be his fuccelfor, and the ledgment being approved
by the nation, he went to Henry, without waiting for the hour
of death, the crown, the sceptre, the lance, the sword, and
other imperial ornaments.

Henry I. ascended the imperial throne of Germany in
919. He was surnamed the Fwedcr, because he was paffion-
ately fond of hawking. To confirm his authority, he made
more use of perfuafion than of arms. His defendants, the
three Othus, were placed in fucceffion on the imperial throne
by the suffrages of their countrymen. The extensive terri-

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otaries of the Saxon emperors, their eminent abilities, and en-
tering genius, not only raised new vigour to the imperial
dignity, but raised it to higher power and pre-eminence. Otto
the Great marched at the head of a numerous army into
Italy, and, after the example of Charlemagne, gave law to
that country. On his arrival at Rome, he was consecrated
by the pope, and crowned emperor of the Romans. He
created popes and deposed them by his sovereign mandate.
He annexed the kingdom of Italy to the German empire.
Elated with his successes, he assumed the title of Caesar Aug-
gustus. A prince, born in the heart of Germany, pretended
to be the successor of the emperors of ancient Rome, and
claimed a right to the same power and prerogative. See the
Biographical Article Otto.

But while the emperor, by means of these new titles and
new dominions, gradually acquired additional authority and
splendour, the nobility of Germany had gone on at the same
time extending their privileges and jurisdiction. The situation
of affairs was favourable to their attempts. The vigour which
Charlemagne had given to government quickly relaxed. The
imperial power of the emperors was found insufficient to have
encouraged valiant, less enterprising than the nobles of that
age, to have claimed new rights, and to have afforded new
powers. The civil wars in which other emperors were en-
gaged, obliged them to pay perpetual court to their subjects,
so whole support they depended, and not only to convoy at
their usurpations, but to permit and even to authorize them.
Elefs gradually became hereditary. They were transmitted
not only in the direct, but also in the collateral line. The
iniquity of them was demanded not only by male but by
female heirs. Every baron began to exercise sovereign jurisdic-
tion within his own domains, and the dukes and counts of
Germany took wide steps towards rendering their territories
disunited and independent states. The Saxon emperors ob-
erved their progress, and were aware of its tendency. But
as they could not hope to humble vassals already grown too
potent, and as they had turned their whole force and atten-
tion to that enterprise, and as they were extremely intent on
their expeditions into Italy, which they could not undertake
without the concurrence of their nobles, they were solicitous
not to alarm them at the same time by their prudence. They
aimed, however, at undermining their power. With
this view, they inconsiderately bestowed additional territories,
and accumulated new honours on the clergy, in hopes that this
order might serve as a counterpoise to that of the nobility
in any future struggle.

The unhappy effects of this fatal error in policy were
quickly felt. Under the emperors of the Franconian and
Swabian lines, whom the Germans, by their voluntary elec-
tion, placed on the imperial throne, a new face of things
appeared, and a fece was exhibited in Germany which ablo-
nished all Christendom at that time. The popes, hitherto
dependent on the emperors, and indebted for power as well
as dignity to their beneficence and protection, began to claim
a superior jurisdiction, and in virtue of authority, which
they pretended to derive from heaven, tried, condemned, ex-
communicated, and deposed their former masters. These
pretensions gave rise to the factions of the Guelfs and
Ghibellines, of which the former was attached to the popes,
and the latter to those of the imperial house. Emperor Gregory VII. had ob-
served that the princes and nobles of Germany had acquired
such considerable territories and such extensive jurisdiction,
as rendered them not only formidable to the emperors, but
dispelled them to favour any attempt to circumscribe their
power. He forewove that the ecclesiastics of Germany, raised
almost to a level with its princes, were ready to support any
person who would stand forth as the protector of their pri-

vileges and independence. With both of these Gregory ne-
gotiated, and had secured many devoted adherents among
them, before he ventured to enter the lists against the head of
the empire. He began his rupture with Henry IV., upon a
pretext that was popular and plausible. He complained of
the venality and corruption with which the emperor had
granted the indulgence of benefices to ecclesiastics. He con-
tended that this right belonged to him, as the head of the
church; he required Henry to confine himself within the
bounds of the civil jurisdiction, and to abstain for the future
from such sacrilegious encroachments on the spiritual
mission. All the censures of the church were denounced
against Henry, because he refused to relinquish those powers
which his predecessors had uniformly exercised. The most
considerable of the German princes and ecclesiastics were ex-
cited to take arms against him. His mother, his wife, his
funs, were brought upon to diffuse all the ties of blood
and duty, and to join the party of his enemies. At length,
the emperor was even obliged to appear as a supplicant at
the gate of the castle in which the pope resided, and to
bknd the chance of three days in痞求的ent, implo-
ing a pardon, which he obtained with difficulty.

This act of humiliation degraded the imperial dignity.
The two factions kept Germany and Italy in perpetual agi-
tation during three centuries, and, notwithstanding the re-
turn of some short intervals of vigour, under the administra-
tion of a few able emperors, the imperial authority continued
to decline. During the anarchy of a long interregnum, sub-
sequent to the death of William of Holland, it dwindled
down almost to nothing.

In the year 1273, Rodolthus of Hasburgh, the founder
of the house of Austria, was elected emperor, not that he
might re-establish and extend the imperial authority, but
because his territories and influence were so inconsiderable as to
force to his various nobles, who were willing to
prefer the forms of a constitution, the power of which
they had destroyed. Several of Rodolhus's successors were
placed on the imperial throne from the same motive, and al-
most every remaining prerogative was wrested out of the hands
of feeble princes, unable to exercise or to defend them.

During this period of turbulence and confusion, the con-
stitution of the German empire underwent a total change.
The princes, the great nobility, the dignified ecclesiastics,
and the free cities extended their usurpations. They claimed
and exercised the right of governing their respective terri-
tories with full sovereignty. They acknowledged no supe-
rior with respect to any point relative to the interior admi-
nistration and police of their domains. They enacted laws,
imposed taxes, coined money, declared war, concluded peace,
and exerted every prerogative peculiar to independent
states. The forms of feudal subordination formed the only
connection among the various members of the community.
This bond of union, however, was extremely feeble.

From the accession of Rodolph of Hasburgh, to the
reign of Maximilian, the empire felt every calamity which
a state must endure, when the authority of government is so
much relaxed. The diffusions among its members gave rise
to perpetual private wars, which were carried on with all the
violence that accompanies resentment when unrestrained by
superior authority. Rapine, outrage, exactions, became un-
iversal. The variety of expedients employed to restore order
and tranquillity, prove that the grievances occasioned by this
state of anarchy had become intolerable. Arbitrators were
appointed to terminate the differences among the several
states. The cities united in a league to check the extortions
of the nobility, and the latter formed confederacies to main-

Germany.  

Certain tranquility among their own order. Germany was divided into ten circles, in each of which a provincial jurisdiction was established. But all these remedies proved ineffectual. At length Maximian instituted the imperial chamber, a tribunal composed of judges named partly by the emperor, partly by the several states, and vested with authority to decide finally concerning all differences among the members of the Germanic body, and thus restored some degree of vigour to the imperial authority.

But by diminishing the salutary effects of these regulations, the political constitution of the German empire, at the beginning of the sixteenth century, was of a species so peculiar as not to resemble perfectly any form of government known either in the ancient or modern world. It was a complex body, formed by the association of several states, electors, princes, dignitaries of the church, counts, barons, and free cities, each of which possessed sovereign and independent jurisdiction within its own territories. Of all the members which composed this united body, the emperor was the head. In his name all decrees and regulations, with respect to points of common concern, were placed; and to him the power of carrying them into execution was committed. But this appearance of monarchical power in the emperor was more than counterbalanced by the influence of the princes and states of the empire in every act of administration. No law extending to the whole body could pass, no resolution that affected the general interest could be taken without the approbation of the diet of the empire held at Ratisbon. In this assembly every sovereign prince and state of the Germanic body had a right to be present, to deliberate and to vote. The decrees or resolutions of the diet were the laws of the empire, which the emperor was bound to ratify, and to enforce. In this respect the German empire was similar to the Achæan league in ancient Greece, or to that of the United Provinces of the Netherlands, and of the Swiss cantons in modern times. But, as the acute historian of the emperor Charles V. observes, the Germanic body was not formed by the union of members altogether distinct and independent. All the princes and states, joined in this association, were originally subject to the emperors, and acknowledged them as sovereigns. They originally held their lands as imperial fiefs, and owed the emperor all those services which feudal vassals are bound to perform to their liege lord. But though this political subjection was entirely at an end, the ancient forms introduced while the emperors governed Germany with authority not inferior to that which the other monarchs of Europe possessed, still remained. Thus an opposition was established between the genius of the government and the forms of administration in the German empire. The formers considered the emperor only as the head of a confederacy, the members of which, by their own volition, chose him to that dignity; the latter seemed to imply that he is really invested with sovereign power. The emperors were distinguished by the most pompous titles, and by such marks of dignity as intimated their authority to be superior to that of all other monarchs. The greatest princes of the empire attended and served them, on some occasions, as officers of their household. They exercised prerogatives which no other sovereigns ever claimed. They retained pretensions to all the extensive powers which their predecessors had enjoyed in any former age. But, at the same time, instead of possessing that ample domain which had belonged to the ancient emperors of Germany, and which stretched from Baill to Cologne, along both banks of the Rhine, they were stripped of all territorial property, and had not a foot of land that belonged to them as heads of the empire. Their revenues were reduced almost to nothing, and the extraordinary aids which, on a few occasions, they obtained, were granted sparingly, and paid with reluctance. The confluence of this ill-compacted frame of government was, that the emperors imagined themselves to be the real sovereigns of Germany, and aimed continually at recovering the exercise of those powers which the forms of the constitution seemed to vest in them, and which their predecessors Charles-magne and the Ottos had actually enjoyed. The princes and states, aware of these pretensions, watched the motions of the imperial court to curtail the power within limits still more narrowed. This salutary of the imperial authority increased confederately from the time that the elective power was vested in a few princes of chief dignity.

During a long period, all the members of the Germanic body had a right to assemble, and to make a choice of the person whom they appointed to be their head. But amidst the violence and anarchy which prevailed for several centuries in the empire, seven princes, who possessed the most extensive territories, and who had obtained an hereditary title to the great offices of the state, acquired the exclusive privilege of nominating the emperor. This right was confirmed to them by the golden bull (see Bull); the mode of exercising it was afockerted, and they were dignified with the appellation of Electors. (See Elector.) The nobility and free cities, being thus stripped of a privilege which they had once enjoyed, were left connected with a prince, towards whose elevation they had not contributed by their suffrages, and came to be more apprehensive of his authority. The electors, by their extensive power, and the distinguishing privileges which they possessed, became formidable to the emperors, with whom they were placed almost on a level in several acts of jurisdiction. Thus, the introduction of the electoral college into the empire strengthened the principles of discord in the Germanic constitution, which were continually alimented by the various and repugnant forms of civil policy in the several states. The free cities were small republics, in which the maxims and spirit peculiar to that species of government prevailed. The princes and nobles to whom supreme jurisdiction belonged possessed a sort of monarchical power within their own territories. Their common deliberations could not be carried on with the same spirit while the love of liberty and attention to commerce were the reigning principles in the cities; and the desire of power, and ardour for military glory, the governing passions of the princes and nobility. The secular and ecclesiastical members of the empire were as little fitted for union as the free cities and the nobility. Considerable territories had been granted to several of the German bishops and abbots, and some of the highest offices of the empire, having been annexed to them unalienably, were held by the ecclesiastics raised to these dignities, while the younger sons of noblemen of the second order, who had devoted themselves to the church, were commonly promoted to these stations of eminence and power; and it was no small mortification to the princes and great nobility, to see persons raised from an inferior rank to the same level with themselves, or even exalted to superior dignity. The education of these churchmen, the genius of their profession, and their connection with the court of Rome, rendered their character, as well as their interest, different from those of the other members of the Germanic body, with whom they were called to act in concert. Thus another source of variance was opened.

To all these causes of disfension must be added one more, arising from the unequal distribution of power and wealth among the states of the empire. The electors and other nobles of the highest rank not only possessed sovereign jurisdiction, but governed such extensive, populous, and rich countries.
countries, as rendered them great princes. Many of the other members, though they enjoyed all the rights of sovereignty, ruled over such petty domains, that their real power bore no proportion to this high prerogative. The electors and emperors, by turns, endeavoured to extend their own authority, by encroaching on those feeble members of the Germanic body, who sometimes defended their rights with much spirit, but more frequently, being overwhelmed or corrupted, tamely surrendered their privileges, or merely favoured the designs formed against them.

But the empire of Germany comprehended countries of such vast extent, and was inhabited by such a martial and hardly race of men, that when the abilities of an emperor, or zeal for any common cause could rule this unwieldy body, it was still able to act with force. Charles V. grand son of Maximilian, and heir to the kingdom of Spain, in right of his mother, was elected emperor in the year 1519. In his reign happened the reformation of religion caused by Luther, which occasioned incessant wars till 1648. (See Luther and Reformation.) There were moments when Charles V. flattered himself with the hope of being able to hold the balance between the Roman Catholics and the Lutherans. But the contending parties were too much inflamed with animosity, and in addition to his wars against Francis I. of France, he was forced to sustain a violent one in the heart of the empire. Fortune, which smiled upon him in the beginning of his reign, forsook him towards its end. He abdicated the imperial throne, in 1558, in favour of his brother Ferdinand I., who had the address of getting his son Maximilian II. declared king of the Romans, or successor to the imperial crown in his lifetime. This precaution became familiar to the house of Austria, and kept the imperial sceptre in that family, until the extinction of the German empire. By his last will Ferdinand ordered that if either his own male issue, or that of his brother Charles should fail, his Austrian estates should revert to his second daughter Anne, wife to the elector of Bavaria. This circumstance is the origin of the opposition made by the house of Bavaria, in later times, to the Pragmatic sanction in favour of Maria Theresa, mother of Joseph the second.

The reign of Maximilian II. was disturbed by internal commotions, and an invasion from the Turks. He died in 1576, and was succeeded by his son Rodolph, who was involved in wars with the Hungarians, and in differences with his brother Matthias, to whom the empire devolved at his death. Having no children, Matthias conferred the crown of Hungary on his cousin Ferdinand arch-duke of Austria, and caused him to be elected king of Bohemia, which election proved the source of a long war. Ferdinand perfecuted the numerous sectaries in Bohemia. They took up arms; the brave Mansfeld fought at their head, and Matthias, who came to the assistance of his kinsman, died of vexation, for not having been able to obtain a complete triumph over the Bohemians. A tender of the imperial crown was made to Maximilian, duke of Bavaria, but he prudently declined the offer. Ferdinand was therefore proclaimed emperor in 1619, but the Bohemians, maintaining that the same individual could not wear the crown of Germany together with that of Bohemia, conferred the latter on Frederick, the elector palatine. Yielding to the intrigues of his fiancee Elizabeth, daughter of James I. of England, against his own conviction, Frederick made a splendid triumphal entry into Prague; but a few days after, his army was attacked on the heights near the town, and completely routed. He was obliged to fly with his wife and children, and found at last an asylum in Holland. His defeat was the beginning of the thirty years' war which ravaged Germany, from the Danube and the Rhine to the shores of the Baltic, without little intermission from the battle of Prague to the peace of Weilphalia. The unfortunate Frederick, who had been put under the ban of the empire, died broken-hearted. Ferdinand's arms were almost constantly victorious against the Protestant princes for the space of ten years. He was on the point of crushing their party when Guilielmus Adolphus of Sweden rushed upon him. In vain did the Imperialists commanded by Tilly endeavour to check his career; they were defeated and disheartened. Ferdinand was going to sue for peace when the fall of the Swedish monarch at Lutzen re-animated his hopes: Wallenstein's defection did not arrest his arm. He continued fighting against his Protestant vassals till the hour of his death, which happened in 1637. The war raged with unabated fury under his son Ferdinand III., who was appointed his successor on the imperial throne. The Protestant cause was ably defended by the heroes brought up under the great Guilielmus Adolphus. History will never forget the names of the duke of Saxony, of Brandenburg, of Austria, of Tuscany, and many others who shook the Austrian power, till at length a general peace was concluded in 1648, which being guaranteed by Sweden and France, has been considered for a century and a half as forming the basis of the political system of Europe, under the name of the peace of Munster or peace of Weilphalia.

Leopold I., who was elected emperor of Germany, after the death of his father Ferdinand III. in the year 1657, had to combat the French on one side, and the Turks on the other. The latter advanced to the walls of Vienna, but were compelled to raise the siege by the valour of John Sobieski, king of Poland. The fertile province of Alsace was conquered by France, but the Turks, having been repeatedly defeated by prince Eugene of Savoy, were forced to cede Transylvania by the peace of Carlowitz. During Leopold's long reign, the duke of Hanover was admitted into the electoral college, the elector of Saxony obtained the elective royal crown of Poland, the elector of Brandenburg was acknowledged hereditary king of Prussia, and a prince of the Bourbon family was seated on the Spanish throne. Leopold died in 1705. The reign of his son Joseph I. lasted but six years, and is remarkable only for the victories which the great duke of Marlborough gained in his cause over the French. As he left no male issue, the elector of Mayence exerted all his influence to procure the imperial crown to his brother the archduke Charles, who was at that time in Spain, disputing the crown of that kingdom with Philip of Anjou, grandson to Louis XIV. The elevation of Charles to the empire terminated the contests which had harassed Spain and Germany. The peace of Utrecht, concluded in 1713, was followed by that of Baden with France in 1714, and that of Passawitz with the Turks in 1717.

Charles VI. intent upon securing his hereditary dominions to his archduchess Maria Theresa his daughter, framed that famous Pragmatic sanction which was soon to disturb again the peace of Germany. Happily for him the crown of Great Britain devolved to the house of Hanover, which circumstance drew the connection of Austria and England against their common enemy more close. Charles VI. married his daughter to Francis duke of Lorraine, and died in 1740. No sooner was he in the grave than the Pragmatic sanction was attacked on all sides. The great Frederick of Prussia conquered Silesia, and Spain and Bavaria preferred their claims on several provinces. The intrigues of France caused the imperial throne to be filled, after an interregnum of two years, by the elector of Bavaria, who took the name of Charles VII., and was proclaimed emperor in 1742. But
But after five years of disastrous warfare, he died deprived nearly of all his states. Maria Theresa had sufficiently influence to place her husband on the throne of the empire in 1745. Francis I. was acknowledged as emperor of Germany by the king of Prussia at the peace of Dresden, signed on the 25th of December 1745, and by the French, at the peace of Aix-la-Chapelle in 1748.

The interval of peace which Germany enjoyed was not of long duration. Frederick the Great of Prussia having discovered the plots which were formed against him by the emperor, the elector of Saxony, Russia and France, and being beseiged by England, occupied Saxony, and refilled the attacks of his numerous enemies with alternate successes, for the space of seven years. Peace was at length signed once more at Hubertsburgh on the 15th of February 1753. Francis I. died two years after. His son Joseph II, who had been declared king of the Romans in 1764, was proclaimed emperor after his death. His attempt to polish himself of part of the dominions of Charles Theodore, the last elector of Bavaria, who died in December 1777, disturbed the peace of Germany. No battle of any consequence was fought: the Austrians routed the Prussian armies; but the severe winter campaign of the latter end of 1778, and the beginning of 1779, having thinned the ranks of both, the treaty of Teschen was concluded on the 13th of April 1779, and the peace of Wilhelmina appealed to, and confirmed for the last time. Maria Theresa left her hereditary dominions to her son Joseph II. at her death, which happened in 1780. Frederick the Great of Prussia, who was the last pilar of the Germanic constitution, died in 1786.

Ambitious of imitating the example of his illustrious opponent, Joseph II. introduced many salutary reforms in the administration of his dominions, proclaimed an unbounded religious toleration, suppressed a number of useles convents, abolished the use of the rack in criminal inquisitions, and extinguished the remains of servitude and vilainage which oppressed the peasants of his dominions. But his well-intended innovations were too sudden. Discontents broke out in the Netherlands, which he vainly attempted to stifle by force instead of adopting conciliatory measures. The rebellion of his Flemish subjects broke his heart. He died childless, though he had been married twice; and his brother Leopold, grand duke of Tuscany, succeeded him on the imperial throne in 1790. His unfortunate engagement with the king of Prussia and the elector of Saxony, to oppose the French revolution with all their might, and to assist the emigrants in their attempts to re-enter France by force, hastened the violent measures of the war party in France, which ultimately led to the extinction of the German empire. He died on the 1st of March 1792. His son Francis II. was raised to the imperial throne in the middle of July following. He embarked in the confederacy formed against France, left the Austrian Netherlands, the Brugia, and all his possessions in Italy, and was at length obliged to abdicate the imperial throne of Germany, and to be contented with the title of emperor of Austria. See CONFEDERATION OF THE RHINE.

The peace of Wilhelmina, which had been regarded as the basis of the political system of Europe, had, in fact, done the death of the division of the German empire, by conferring on each prince and state of the German empire the privilege of contracting alliances in their own name. Their interests were continually clashing with each other. The irresistible force of revolutionary France has only accelerated a disorganization, which would infallibly have taken place, through the rivalship of the Austrian and Prussian monarchs, supported, one by the Catholic, and the other by the Protestant states. Composed of such discordant materials, it is rather a matter of surprise that its existence as a state should have been protracted to the length of one thousand years.

The Germans never formed a nation united by the ties of similar habits, laws and religion. These differed in almost every petty principality, and the tie of language, from its many idioms and different pronunciation, was so weak, that the national hatred of the inhabitants of the Prussian dominions against those of the Austrian states was as great as that which prevails between the English and the French. The difference between the Protestant and Catholic countries was also so considerable, that whilst farmers in the former enriched their labour by study, the clergyman in the latter were even ignorant of the first four rules of arithmetic. Politzell, a Saxony farmer, who was a fellow of the Royal Society of London, died in 1788, and six months before his death a clergyman was wanted, in the gazette of Cologne, capable of teaching the rudiments of common arithmetic.
The only feature which may be marked as a national one in the Germans of all perfusions and places, is the industry which prevailed among the middle and lower ranks, and the pride and haughtiness of the nobility. As soldiers, the Germans, when ably commanded, have always shown themselves endowed with steady courage and perseverance of strength. But the name of German is extinct. Henceforth the traveller must inquire into the peculiar character and disposition of the Austrian, Prussian, Saxon, Bavarian, Westphalian, and the inhabitants of Wurttemberg, Baden, Berg, Hesse, Darmstadt, Nassau, and the other smaller states of the confederacy of the Rhine. I. G. Meuffel's Statistics, Roberton's Introduction to the History of the emperor Charles V. Busching's Geography. Anc. and Mod. Univ. Hill. Gibbon's Decline, &c. of the Roman Empire.

GERMANY, Upper and Lower, in Ancient Geography, divisions of Gaul; which see.

GERMANY, in Geography, a town of America, in Adams' county, Pennsylvania, containing 1013 inhabitants.

GERMEN, or GERM. See EMBRYO.

GERMEN, in Botany and Vegetable Physiology, the rudiments of the fruit, constituting one of the two essential parts of the flower, the stigma being the other; the style, which usually elevates the latter, not being indistinguishable, nor always present. The Latin word, germ, properly means a bud, or sprout (see GEMMA); which latter, in scientific language, is now universally used in its stead. Linnaeus therefore applied the word technically, and very happily, to the seed—bud, or origin of the future offspring, which had as yet no appropriate name. In this he is generally followed, even by the only person who could effectively have contended with him in such a point, the celebrated Buffon. Nevertheless, Gartner, affuming some well-founded authority on account of his valuable labours reflecting fruits and seeds, prefers the word exuvium, borrowed from anatomists, for it is not classical Latin. The only reason for this innovation is, as he is pleased to express it, that Linnaeus "falsus imprudens" calls this part germ. The authority of Gartner has unfortunately misled one excellent writer of late to adopt the term exuvium, by which we object, not so much for its want of classical authority, as it might well be defended on the ground of analogy, but because it is not appropriate, and is not used by Gartner in the original anatomical sense, but in a new and arbitrary one. Vegetables have no such organ as the exuvium of animals. Plants, much more correctly, calls the germ the uterus; but this is improper for plants with naked seeds; whereas germ is applicable in all cases to the rudiment of the fruit, whatever its nature may
may be. Such a comprehensive term is of the more value, as not having any respect to the disputable point of whether any seeds be really naked or no. We agree with Gartner that they cannot in their origin be naked, but must have some integument through which they are impregnated; see *Reconstitution of Plants*. In an advanced state the same able author could not but allow the existence of naked seeds in a certain sense, that is, such as have only their own external integuments, but no external *pericarpium* or seed-veil.

Gartner's erroneous conclusions the Linnaean hypothesis, that the germinates the pith of the plant, as the Ramses from the woody part. This idea was purely hypothetical, and is unsupported by any anatomical fact, however ingenious the theory of generation deduced from it by the illustrious Swede.

The germinates as early as any part of the flower, of which indeed it frequently constitutes the base. Before the stigma is ripe for impregnation, all the internal parts of the germinates, especially the young seeds, receive their due shape and structure, except only the embryo, the rudiments of which can scarcely be detected at that period. If no impregnation takes place, the germinates, and even the seeds sometimes continue to grow, but a cavity only in such case will be found in the place of the embryo, which has at least proved abortive and withered away, if it ever had any existence. More frequently indeed only the husks or withered rudiments of seeds are found in an advanced unimpregnated germinates; and still more generally the whole germinates withers if the husks and stigmas have not performed their office.

Germinates are either solitary or numerous, simple or aggregate, in different genera of plants. With respect to situation, it is important to note whether the germinates be superior, that is, above the bases of the calyx and corolla, or inferior, below them. Such a difference commonly marks a very essential generic distinction, yet in that most natural genus *Saxifraga*, some species have a superior and others an inferior germinates. This proves, on a careful anatomic investigation, to depend merely on a greater or less degree of elevation of the organ in question within the cavity of the calyx. Indeed such an investigation of flowers in general will shew that there is perhaps no such thing as an inferior germinates, strictly speaking, because there must necessarily be a continuation of the integuments of the flower and their veils, in some form or other, along the outer part of what is commonly deemed an inferior germinates, to the stalk whence their nourishment is derived. But this "were to consider too curiously." The line is in almost every case drawn with sufficient distinctness for all useful purposes, and is generally indicated in due time by a spontaneous separation of parts. *Sanguinaria* is erroneously judged by Linnaeus to have the germinates below the corolla though above the calyx, a drague and unexampled circumstance indeed! He was misled by the close adhesion of the thin papillose tube of the corolla to the germinates. In *Adonis*, however, there is an approach towards such a singularity of structure, the calyx being inflected half way down, while the corolla crowns the germinates, for this plant, being akin to *Saxifraga*, partakes of that irregularity of position in the germinates which we have already described.

Nothing is more wonderful than that difference of vascular constitution in the germinates of different genera or natural orders, by which, though in all cases nearly equally juicy while young and growing, in some it becomes corymbose, or woody, and dry, as it ripens, while in others it attains a soft pulpy consistence, which obliterates all its original natural structure. The wise ends answered by these differences are indeed apparent, but the means by which they are accomplished are, if not inferable, at least unexplained.

GERMEN, Sr., in Geography, a town of France, in the department of the Oise; 12 miles W. of Beauvais.

GERMERSHEIM, a town of France in the department of Mont Teenere, and chief place of a canton, in the district of Spire; 5 miles S. of Spire. The place contains 1251, and the canton 11,735 inhabitants, in 16 communes. It is situated at the confluence of the Queich and the Rhine, and was erected into a town by Rodolphus II., who died here in 1290. It was taken by the French in 1794. N. lat. 49 12. E. long. 8 25'.

GERMINATION, in Vegetable Physiology, the first beginning of vegetation in seeds, is accomplished by moisture, heat, and air, acting mechanically and chemically on the substance and component parts of the seed, as well as stimulating its vital principle. These agents must perform their functions together, in order to produce a vital effect, otherwise the vital principle, or the chemical properties of the seed, may be stimulated or spoiled, nor must their application, generally speaking, be longer delayed than usually happens in the ordinary course of nature. Some seeds, indeed, may be kept out of the ground for years, or may remain buried far beneath its surface, we know not how long, without losing their vegetative power; while others must scatter themselves in their own way, immediately from the seed-veil, in order to succeed with certainty. A seed absorbs, through the velum of its base, or face, any moisture that comes in its way, and it soon meets with such a supply when committed to the ground, at the same time receiving throughout its whole substance, a definite portion of heat, some seeds requiring more than others. Atmospheric air is also necessary to the germination of seeds, on account of the oxygen gas which makes a part of its composition, and which modern chemists have found to be absorbed by seeds, in the moments of incipient germination, from or through the surrounding soil. This appears from their being incapable of vegetation while buried deep in the earth, or while under the exhausted receiver of an air-pump; though such as have been so situated immediately grow, when the atmosphere has access to that part of the foil in which they lie. By the above agents the bulk of the seed is increased, and its vital principle stimulated. The integuments burst, and the radicle, or young root, protrudes, which being most susceptible of the influence of moisture, for that reason (as Dr. Darwin ingeniously judged,) elongates itself in the direction where it meets with this influence, increasing chiefly at the extremity, and descending into the earth. It is a well-known fact that the radicle takes this direction, in whatever position the seed may happen to lie. Dr. Darwin's seen to us the full explanation of this curious law of the vegetable constitution, and preferable to any one founded on principles of mechanics or of gravitation. Accordingly, the rudiments of the young plant, constituting the cotyledons and plumula or bud, being most stimulated by air, raise themselves out of the ground, entirely for the most part, in pursuit of it. If some few cotyledons do remain and wither under ground, it is only because they have already met with a sufficiency of air or oxygen to answer their destination. See COTYLEDONES.

During the process of incipient germination, the immediately necessary fulplings of nourishment, till the young root can derive any from the soil, are furnished by the *albumen*, a substanee either constituting a separate body of itself, as in grapes, corn, palms, &c., which, from a hard, dry, and scttlec mats, changes, by the action of water and oxygen, into a milky or facehairy fluid, withes the operation
tion of making; or the same substance is lodged in, or united with, the bulk of the cotyledons, as in the leguminous tribe. If the albumen happens to suffer chemical deterioration, by keeping or otherwise, the feed germinates more feebly, or not at all. Hence gardeners prefer old feeds of melons and cucumbers, as producing less luxuriant plants, and more fruit in proportion. We presume the consequences of keeping affect the chemical qualities of the albumen before the vital principle suffers, because of the success of recent French chemists, who by the copious application of oxygen restore their original nature. See this whole subject more fully detailed in the Transactions of the Linnean Society, vol. 9. p. 202—217. 8.

GERMISCH, in Geography, a town of Germany, in the province of Fresny, 21 miles S. of Weilheim.

GERMONIO, Anaxiastes, in Biography, was born at Salo, in Piedmont, in 1551; his education was almost entirely neglected till he had attained the age of manhood. Feeling, at this period, his own deficiency, he applied himself with so much diligence, that in the course of a few months he felt equal to engage in the study of the law. He took his degree at the university of Turin, and was appointed to the professorship of the canon-law, an office which he held, in conjunction with other posts of honour and emolument, till his archbishop was created a cardinal; he then accompanied him to Rome, and acquired the esteem of Sixtus V. and the succeeding pontiffs. He was appointed by Clement VIII. to assist in compiling the seventh book of decrees, in which were inserted the decrees of the council of Trent, with explanations. After this he was entrusted by the dukes of Urbino and Savoy with the management of their concerns at the see of Rome. So high was his reputation, that two bishops were offered him which he refused, but at length accepted the archbishopric of Taranto, in Savoy. He was next sent embassador, by duke Charles Emanuel, to the court of Madrid, where he died in 1627. Besides his notes on the Decrees, and other smaller pieces on the Digest and Code, he published "De Sacerorum inimicittatis Lib. tres, &c." printed at the Vatican, 1591:—"Pomeridianæ felicium in quibus Latina Linguæ dignitas defenditur," &c. His writings are highly esteemed for the purity of the language and the accuracy of the refutation. Moreri.

GERMS, in Geography, a town of Austria; 62 miles W.N.W. of Vienna. N. lat. 48° 32'. E. long. 15'.

GERMUK, a town of Asiatic Turkey; 45 miles W. of Diarbeikir.

GERN, a town of Russia, in the government of Tav; 28 miles W.S.W. of Tula.—Also, a town of Bavaria; 15 miles W.N.W. of Braunau.

GERNACH, a town of Germany, in the principality of Wurzburg; 5 miles W.N.W. of Gerdhoien.

GERNOI, a fortress of Russia, in the government of Kolivan, seated on the Irithich; 204 miles S.W. of Kolivan. N. lat. 51° 45'; E. long. 78° 14'.

GERNOI, a fortress of Russia, in the government of Kolivan, on the Irithich; 196 miles S.W. of Kolivan. N. lat. 52° 30'; E. long. 77° 14'.

GERNORITZKOW, a fortress of Russia, in the government of Kolivan, on the Irithich, 180 miles W.S.W. of Kolivan. N. lat. 52° 45'; E. long. 77° 34'.

GERNRODE, a town of Germany, in the principality of Anhalt Berinh, in which was an abbey founded in 666, and richly endowed for ladies, by Gero, margrave of Lusatia, which was secularized in favour of the house of Anhalt, at the peace of Weilphalia; 30 miles W. of Delhau. N. lat. 51° 45'; E. long. 11° 20'.

GERNSHEIM, or Gernsheim, a town of Germany, given, in 1802, to the landgrave of Hesse-Darmstadt; 81 miles E.E. of Mentz.

GERNOSZEG, a town of Transylvania, on the river Maros; 10 miles S.W. of Kerefattur.

GEROCOMIA, of sacred, and religious, i.e. religious; a term used by the ancients for that sort of medicinal practice which treated of the proper regimen to be observed in old age.

GEROLA, in Geography, a town of Germany, in the territory of Eichfeld, with a rich Benedictine abbey; eight miles N.E. of Duderstadt.

GERODOT, a town of France, in the department of the Aube; nine miles E. of Troyes.

GEROLDSHOFEN, a town of Germany, in the bishopric of Wurzburg; 26 miles N.E. of Wurzburg.

GEROLDSTEIN, a town of Germany, in the county of Katzenelnbogen; seven miles S. of Naftede.

GEROLSTEIN, a town of France, in the department of the Sarro, and chief place of a canton, in the district of Prum; 24 miles N. of Treves. The place contains 550, and the canton 2892 inhabitants, in 29 communes. N lat. 50° 16'. E. long. 6° 58'.

GERON POINT, a cape of Ireland, in the county of Antrim, on the east coast. W. long. 5° 50'. N. lat. 55° 3'.

GERONA, or Gironne, Lat. Gerunda, a town of Spain, in the province of Catalonia, the see of a bishop, suffragan of Tortosa. This is a fortified town, of nearly a triangular form, situated on the side and at the foot of a steep mountain; the river Tur runs through it. The streets are narrow and crowded, but the houses are tolerably well built. It has several churches and convents; and its population amounts to about 14,000 persons, a fourth of which number consists of priests, monks and nuns, scholars and students. Several provincial councils have been held in this place, one in 517, another in 1068, &c. The trade of this town is inconsiderable, and its only manufactories consist of a few looms for flockings, coarse cloths, and woollen and cotton stuffs. The cathedral and collegiate churches are the two most remarkable edifices in Gironne. The treasury of the cathedral is richly furnished with chalices, crozets, shrines, relics, &c. of gold and silver set with jewels. In the Capuchin convent there is an Arabian bath, constructed in the most elegant style, and consisting of columns standing on an octagon stylobate, or low-labs, encircling a referror to contain water. The university of Gironne, founded in 1521 by Philip II., was abolished in 1715 by Philip V. After the suppression of the Jesuits, public instruction was concentrated in one college, accommodating 920 students, who are taught the Latin grammar, rhetoric, philosophy, and theology. The library is little and extensive. Schools are kept by the community of the Beguine nuns for the gratuitous instruction of poor girls; 47 miles N.E. of Barcelona. N lat. 41° 10'. E. long. 2° 35'.

GERONIMO, 777, a town of Mexico, in New Biscay; 90 miles N. of Parral.

GERONTE, a small island in the Mediterranean, near the coasts of Tarentum, and N.W. of Taranto, is 20° 30' W. long.
The female of gerentes were called *gerusfas*, that is, assembly or council of old men.

The gerentes were originally instituted by Lycurgus; their number, according to some, was twenty-eight; and, according to others, thirty-two. They governed in conjunction with the king, whose authority they were intended to balance, and to watch over the interests of the people. Polybios defines their office in few words, when he says, "per ipsos, et cum ipsos omnia administrati." None were admitted into this office under sixty years of age, and they held it for life. They were succeeded by the Ephors.

Geronessa, in Geography, a small island in the Gulf of Enga; four miles south of Enga.

Gerontoxon, in Surgery, a little ulcer, shaped like the head of a dart, and making its appearance occasionally on the cornea of old persons. The term is derived from *pterus*, an old person, and *pteros*, a dart.


Gen. Ch. Common calyx simple, of numerous upright, lanceolate, somewhat awl-shaped, keeled leaves, longer than the corolla. Cor. compound, somewhat imbricated, uniform; each floret hemeraphrodite, with a corolla of one petal, ligulate, abrupt, five-toothed; the outer ones equal in number to the calyx-leaves, inner ones fewer and shorter. Stam. Filaments five, very short; anthers united into a cylindrical tube. Pet. Germen oblong; style thread-shaped, the length of the flower, stigma a sigmas two, thread-shaped, recurved. Picros, none, except the permanent, oblong, upright, gaping calyx. Seeds of the circumference awl-shaped, as long as the calyx; their crown stalked, of five spreading rough bristles; those of the disk awl-shaped, but shorter, their crown feathered. Recept. naked.

Eff. Ch. Receptacle naked. Calyx simple, of many leaves. Seeds of the disk with a feathery crown; those of the circumference with one of five naked rays.

Obs. Linnaeus originally described the receptacle as naked, which is confirmed by Gartner, Wildenow, and Jacquin. Afterwards he attributed feathery secales to this part, which is adopted by Schreber, but, as we believe, without foundation. Jacquin, in consideration of the etymology, properly makes this genus, as well as *Tragopagon* and *Aridopogon*, of the masculine gender.

Two certain species of *Geropogon* only are known. They have the cloffel natural affinity to *Tragopagon*, but differ in the brillying, not feathery, crown of their external row of seeds. The genus is merely artificial, as not at all supported by habit, nor is the difference in the crown of the seeds greater than what occurs amongst indubitable species of one genus in others of this natural order.

1. *G. globus*. Linna. Sp. Pl. 1109. Jacq. Hort. Vind. v. 1. t. 32.—Leaves smooth. —Native of Italy. One of the Levant, sometimes kept in botanic gardens for curiosity only. It is annual, with a branched stem, 12 or 18 inches high, clothed with many alternate, clasping, long, grasy, smooth leaves, each branch terminated by a small, inconspicuous, pale pink flower, like the pink hawkweed, but far less handclaw. The seeds are larger and more remarkable. The herb abounds with milky bitter juice. Nothing can be more closely allied to this plant than *Tragopagon porrfusius* of Linnaeus: see Engl. Bot. t. 638.

2. *G. hisbarus*. Linna. Sp. Pl. 1109. (Tragopagon graminisfoliis, funerabenre flore; Column, Euphr. t. 231.) —Leaves hairy. —Found by Columba, who alone of all botanists seems actually to have seen this species in a wood of wild pear-trees near Cambod in Italy, flowering in May. It appears to differ from the preceding, chiefly in the roughness of its leaves, which nevertheless is so precisely and forcibly indicated by Columba, that we dare not prejudice it not to be a sufficient distinction. All authors have adopted this plant from Columna, nor had Linnaeus a specimen.

A third species occurs in recent writers, *G. calcisculus*; Linna. Syll. Veg. ed. 13. 572. (Tragopagon calcisculus; Jacq. Hort. Vind. v. 2. 48. t. 166.) This was received by Jacquin from Italy, and he sent a specimen to Linnaeus, who referred it to *Geropogon*. The habit is that of a Scorzoner. Root perennial. Flower-stalk, calyx, and upper leaves hairy. Calyx of a double row of scales, shorter than the calyptra, which is yellow. Crown of the seed slightly hairy, and, as far as we can perceive, uniform. —This is certainly no genuine *Geropogon*, and we are convinced it is the identical *Scorzoner hisbarus* of Linnaeus, well figured in Columna's Euphrasius. t. 233, though unfortunately we cannot prove it to demonstration, there being no specimen of the latter in the Linnaean herbarium. The plant in question is however the *Geropogon hisbarus* of Allioni, Fl. Pedem. v. 1. 229, as his synonym *Grew*, though he took it to be annual. S.

Gerard, in Geography, a county of Kentucky, in America, containing 6838 inhabitants, of whom 1234 are slaves.

Gerards, Peter van Zyl, in Biography, a painter, born at Amsterdam in 1607. He came to England and lived in the fame house with Vandyke on terms of friendship and intimacy. He réussi his manner successfullly, and on his return to Amsterdam he was so highly thought of, as to bear the name of the second Vandyke.

Geres, Gerull, or Gerilo, in Laclzology, names given by the Venetians to a fish common in that part of the world. It is the sinars, or main alba of authors. Artedi very judiciously makes it a species of the Iparus, and distinguishs it from others, by its having a black spot on each side, and the pectoral and tail-fins red.

Gerha, from among the Greeks, wicker hurdles, resembling the Roman *cicera*, which the Romans held over their heads to shelter themselves.

Gerhá, or Gerri, in Ancient Geography, a people of Scythia, in Europe, S. of the Daube.-Allo, a people of Alать Sarmatia, not far from the Caspian sea.

Gerlius, a river of Sarmatis, which runs into the Palaus Moctides.-Allo, a river of Alia, in Albania.

Gerlii, in Geography, a town of Spain, in Catalonia; 27 miles N. of Balangner.-Allo, a town of Africa, in Nubia, situated on the Nile; containing about 140 houses; 150 miles N. N. E. of Semmaar. N. lat. 16° 17'. E. long. 33°.

Gerlish, a small island, near cape Neddick, close to the main land of the district of Maine, in America.

Gerry, a township of America, in the state of the Massachusetts, and county of Worcester; incorporated in 1766, and containing 14,500 acres of land, in which are 822 inhabitants; 50 miles N. W. of Worcester.

Geris, a river of France, which rises near La Barthe de Nezes, in the department of the Upper Pyrénées, traverses the department of the Gers, and runs into the Garonne, about three miles S. E. of Agen.

Geris, one of the nine departments of the fourth, or Garonne province of France, bounded on the N. by the department of the Landes and the Lot and Garonne, on the E. by the department of the Upper Garonne, on the S. by the
the departments of the Upper and Lower Pyrénées, and on the W. by the department of Landes. This department is composed of Condommois, Armagnac, and Comminges, and takes its name from the river which crofes it from north to north. Its capital is Auch. It is situated in N. latt. 43° 40'; its territorial extent is 7,524.84 square kilometres, or about 3,393 square leagues, and the number of its inhabitants is estimated at 291,845. It is divided into five districts, viz. Condour, containing 67,104 inhabitants, Lectoure, with 57,445, Auch, having 52,825, Lombez, with 57,392, and Mirande, with 77,979 inhabitants. The number of its cantons is 35, and of its communes 700. The total of its contributions, personal, funtuary, and on moveable and immovable, &c., is 2,685,169 francs, and the expense of administration, justice, and public instruction, is 278,498 francs. The soil of this billy department is indifferently fertile, yielding moderate crops of grain, wine, fruits, and good patures.

GERSA, or GAIRSA, an island of Scotland, five miles E. of Elhnaw, two S. of Weir, and one E. of Mainland, is two miles long and one broad, and contains 50 inhabitants. The greatest part confits of a conical hill; steep on the W. side, and towards the E. more plain and fertile. The only harbour is that of Millburn on the E. coast. See GAIRSA.

GERSAU, or GERSAU, a village or town of Switzerland, at the foot of the Rigis, and the smallest republic in Europe. Its territory is about a league in breadth, and two leagues in length; intuated partly on a small neck of land at the edge of the lake of Schwiitz, and partly lying upon the rapid declivity of the Rigis. It contains about 1,200 inhabitants, having their general assembly of burgesses, their landammann, their council of regency, their courts of justice, and their militia. In the whole republic there is not a single horse; and the only way of arriving at the town is by water, except in the narrow path down the sides of the mountain, which is almost impassable. Geriau is entirely composed of scattered holues and cottages of a very neat and picturesque appearance; each dwelling is provided with a field or small garden. The inhabitants are much employed in preparing flk for the manufactures of Basle. This little republic is under the protection of the four cantons, Lucern, Uri, Schwiitz, and Underwalden; and in case of war furnishes its quota of men. The town is fix miles distant S.W. from Schwicitz. N. lat. 46° 55'. E. long. 8° 20'.

GERSCHITZ, a town of Bohemia, in the circle of Koningesgratz; nine miles N.W. of Koningesgratz.

GERSCHITZ, a town of Germany, in the principality of Bayreuth; six miles E. of Bayreuth.

GERSDORF, a town of Germany, in the principality of Querfurt; four miles N.E. of Juterbog.

GERSON, in Biography, chancellor of the church and university of Paris at the beginning of the fifteenth century; according to whom the ground-work of all diligent was the plain chant; and in his treatise upon the education of children the choir of Notre Dame, he enjoins a particular attention to chanting, counterpoint, and dissonant, as the three most essential branches of their instruction and study. (Magister cantus flatutis horis decet pueros planum cantum principaliert, et contrapunctum, et aequos dissonantiles decent et boner melodies.) He likewise tells us, that in this cathedral, during his time, the choiristers were only allowed, by the statutes, to practice dissonant till their voices broke. (Nec faciat eos tantum inferiore in talibus, quod per- dant in grammatica profectum; attento maximo quod in ecclesia nostra dissonant non cæt in ufu, fed per flatutam pro-hibitus, faltum quod voces non mutata dicuntur). The Abbe Lebeuf understands thee last words as we have translated them: (Le deixant n'est point au ufage dans l'eglise de Vol. XVI.

Paris, et qu'aut contraire il estoit defendu par les flatutes, au moins a l'egard des voix qui avoient passe le temps de la mutation. Tradit Hilt. sur le Contr. Eccles. p. 92.) The indefatigable Abbe Lebeuf found in the king of France's library the flatutes here alluded to, which had been framed in the 13th century, and from which the chancellor had been ordered to make extracts in 1406. He concludes the fourth article of his tract, which relates to psalmody, by informing us that no written dissonant was allowed in church missals or gradual, except for the exercise and improvement of the singing boys. (Nec debet in cantu notulato regulariter immittari dissonant, pueris exceptis propter exercitationem suam. Ger- fon, tom. iv. ultima edit. p. 717.)

GERSPACH, in Geography, a town of Germany, in the county of Eberlein, on the Rigis; taken by the French in 1794; three miles S.E. of Baden. N. lat. 48° 48'. E. long. 8° 26'.

GERSPRINTZ, a town of Germany, in the county of Erbach; seven miles N.W. of Erbach.

GERSTEN, Christian Louis, in Biography, was born at Gieflen in 1701; here he was educated, and in the year 1733 he was appointed professor of mathematics and the mechanical sciences in that city. On account of some dispute he was dismissed from his office, and left Gieflen in 1744; he went first to Altona, and from thence to Peter- burgh; but meeting with no encouragement, he returned and attempted to get reinstated in his office, but failing in his design, he infilted the landgrave, was arrested at Frankfort in 1748, and doomed to perpetual imprisonment in the castle of Marburg, with an annual allowance of 200 florins. Here he employed himself in teaching the mathematics to those young persons who came to his prison for instruction, and his leisure moments were occupied in studying the phenomena of the atmosphere, and the changes which take place in it, so as to become very expert in the science of meteorology. In the year 1760 he was liberated from his confinement, but his freedom was not complete; he was admitted at large for a time by way of proving whether he was entitled to a general discharge: escaping however from his shackles he went privately to Frankfort, where he kept himself concealed, or at least quiet, till he died in 1762. His works were numerous, and written in the Latin language: they chiefly relate to meteorology, to the methods of calculating eclipses, and to the structure of artificial instruments. He was esteemed by his contemporaries for his integrity and his learning. He sent some papers to the Royal Society of London, of which several were inserted in the volumes of their Transactions. Moreri.

GERSTUMEN, in Geography, a town of Germany, in the principality of Eisleben, on the Werra; 8 miles W. of Eisleben.

GERSWALDE, a town of Germany, in the Ucker Mark of Brandenburg; 9 miles S. of Prenzlau.

GERTHAUSEN, a town of Germany, in the county of Henneberg; 15 miles W. of Kuhlungen.

GERTRUDENBERG, a town of Germany, in the bishopric of Osnabruck; mile E. of Osnabruck.

GERTRUIDENBERG, Sr., a town of Brabant, but in later times subject to Hollant, with a good harbour, formed by the Merw, which here extends to a considerable lake, called Ee Bouch; over which is a passage of two hours to Dort. It is built in the form of a crescent, with regular fortifications, good battlements, and forts with sluices: by means of which they can lay the adjacent country under water. In ancient charters it is called Mons Litoris, the mountain of the shore. In 643., Pepin de Landen, duke of Brabant, gave it to his daughter Gertrude, who built
built a church dedicated to St. Amand, bishop of Tongres; but the place afterwards becoming celebrated by the death and pretended miracles of St. Gertrude, it has since been called "Mont de St. Gertrude," or Gertrudenberg. The caflle was built in 1321. After passing through many vicissitudes, it was锤oned by the French in February, 1793, and taken; but soon after evacuated. The French took it again in 1795. It is distant 10 miles S.E. of Dort, and 7 N.E. of Breda. N. lat. 51' 40'. E. long. 4' 44'.

GERTZ, a town of Germany, in the principality of Wurzburg; 5 miles W.S.W. of Munsterflct. GERVAIS, Armand Francis, in Biography, was born at Paris about the year 1662; he was educated with the Jesuits, and at fifteen years of age he entered among the bare-footed Carmelites. At the age of twenty-two he was appointed by his superiors to teach theology to the younger members of the order; and he was at the same time distinguished as a pupil orator. Some years after this he withdrew into the monastery of La Trappe, where he successively filled very important offices belonging to that order. The changes which he introduced, and the reforms which he meditated, created an alarm; and in 1698 he resigned his office, and quitted his residence in the monastery. From this period he wandered about, from solitude to solitude, following the fame ascetic course of life which he had been in the habit of practicing in the college. Having, in 1710, published the history of the Cistercian Order in France, in which was a severe attack upon the Bernardines, he was arrested and imprisoned in the abbey of Notre Dame des Reclus, in the diocese of Troyes, where he died in 1751, at the age of ninety-one. He published, besides the work alluded to, "The Life of St. Cyprian," with an abridgment of his works, including notes and dissertations: "The Lives of Peter Abelard and of his wife Heloise;" "The History of Suger, Abbot of St. Denis," in three volumes; "The History of St. Irenæus," in two vols. 12mo. Also lives of St. Paul, Epiphanius, Rufinus, and other eminent persons. He was distinguished as a controversy. was and the opponent of Father Courayer on the subject of English ordinances. He is characterized as a man of great learning and singular virtues, but his manners were austere, impetuous, and forbidding. Moreiri.

GERVAIS, Sr. in Geography, a town of France, in the department of the Puy de Dôme, and chief place of a canton, in the district of Riom; 15 miles N.W. of Riom. The place contains 2183 inhabitants, and the canton 10,904 inhabitants, on a territory of 2823 square miles, in 11 communes.

GERVAIS-de-Mafey, Sr. a town of France, in the department of the Orne, and chief place of a canton, in the district of Domfront; 9 miles N. E. of Domfront. The place contains 1668, and the canton 17,228 inhabitants, on a territory of 1324 square miles, in 14 communes.

GERVAIS-des-Villes, Sr. a town of France, in the department of Herault, and chief place of a canton, in the district of beziers. The place contains 1263, and the canton 8641 inhabitants, on a territory of 1374 square miles, in 10 communes.


GERVASIO, the nephew of Bernado; was also a painter of considerable merit in the flame styie of colouring, as is evident in a picture of St. Sebastian, in the church of St. Agatha at Cremona, where it is united to the design of the antique; and also in the Martyrdom of St. Cecilia, at S. Pietro, in the same city.

GERVASONI, Sr. in Geography, a town of Italy, in the department of the Mela; 15 miles S. of Brescia.


Ger. Ch. Cal. Perianth inferior, of one leaf, flat, five-toothed, small, green, permanent. Cor. Petals five, lanceolate, abrupt, spreading, thicke as long as the calyx, white. Nectary, a thick ring surrounding the germen, bearing the flaments on its outer edge. Stiam Filaments five, erect, half the length of the corolla; anthers erect, triangular. Fil. Geranium glabrous, deeply imbered in the nectary; style thread-shaped, small; stigma three, widely spreading, red, wedge-shaped, emarginate at the extremity. Petal superior, ovate, of four or perhaps five cells, and as many valves. Seeds two, in each cell, oval, inferted into a triangular white pulp; one of them often abortive.

Eff. Ch. Calyx with five teeth. Petals five, abrupt. Nectary, a ring round the germen. Stigmas three, emarginate. Capsule superior, ovate, of four or five cells. Seeds two, affixed to a pulpy receptacle.

1. G. alba. Leaves alternate, oval-oblong, somewhat serrated.

This is all that can be gathered from Forskall's account, and it forms a botanical enigma. Some circumstances indicate an affinity to Juliflora's Euphorbia. The accounts of the stigma and of the fruit are the most remarkable. Nothing is said of the habit, duration, or possible qualities.

GERUNDI, in Grammar, a sort of tense, or time, of the passive mood: very like to the participle, but indeclinable.

The word is formed of the Latin gerundin; and that from the verb gerere, to bear.

The gerund expresses not only the time, but also the manner of an action; as, he fell in running poth. It differs from the participle, in that it expresses the time, which the participle does not. And from the tense properly so called, in that it expresses the manner, which the tense does not.

Grammarians are much embarrassed to settle the nature and character of the gerund: it is certain they are no verbs, because they do not mark any judgment of affirmation of the mind, which is supposed to be the essence of a verb; and besides, they have their several cases, which verbs have not.

Some, therefore, have likened them to be adjectives passive, whose substantive is the infinitive of the verb; on this footing they denominate them verbal nouns, or names formed of verbs, and retaining the ordinary regimens thereof.

Thus, say they, tempus et leges librorum, vel librorum, is as much as to say, tempus et leges librorum, vel librorum. But others dispute this decision.

The Greeks have neither gerunds nor supines; but instead of
GESNER, in Geography, a town of Germany, in the county of Feldkirch; 4 miles E. of Feldkirch.

GESENDORF, a town of Prussia, in Oberland; 7 miles S. E. of Saale.

GESMOLD, a town of Germany, in the bishopric of Ofenbruck; 12 miles S. E. of Vorden.

GESNER, in Geography, a town of Germany, in the county of Feldkirch; 14 miles S. E. of Vorden.

of them they make use of the infinitive, in the same maner as the French; προτετινη χιλιών; pour boire. When the article happens to be made use of, then its genitive is put for the gerund in δι, as τῶν κατηκρίνοντος, factendi, of doing; the dative or ablative is put for the gerund in δο; and the nentor for the gerund in δυμ. But the infinitive in this tense is often expressed without the article, as ἀρτυρο ἀναίρετα, juculandi portiis, an excellent archer; ζευς ἀναίρετα, ferendum debit, he gave it to carry. In Greek, however, the termination σιε corresponds to the Latin gerunds; thus, from ἀποκρίνεσθαι, to say, is deduced κινετόν, discendam, it must be said. These verbal adjectives, as they may be called, sometimes denominated gerunds, are used occasionally either in an active or a passive sense; τον την χειρισμον, it is for thee to cultivate the ground: το γνωρισθαι εκστητος εἰς θυγατέρα, και εὐγενικά τον τον τοπον εἰς τον, the body should be accustomed to obey the understanding, and be disciplined with toils and sweat. Xenophon.

An ingenious grammarians observes, that the Latin gerunds in δο, do, and dum, are but the participle in das in the oblique cases; and as this is taken from the precent participle, they have its tense, namely, an active tense. On the same principle that participles express powers or habits in action, and their tendency is to dignify those powers, and not their operation, i.e., to become adjectives; the oblique cases of the participle in das, when alone, become in their nature abstract nouns. Hence gerunds, being thus nouns in reality, are governed like other nouns in the genitive, dative, accusative, and ablative, either with or without a preposition; as ratio ferendi, the art of writing; charta utilis feriendo, paper is useful for writing; promptus ad audiendo, ready for hearing, or to hear; memoria expendendo auger, the memory is increased by cultivating. Gerunds also, having the nature of nouns, may govern a genitive; as fowlatas agrorum sui latronibus condonandi, the power of the beholding of his lands on his thieves. The gerunds, however, as retaining in a degree their verbal character, govern the case of their respective verbs, as visendi domum portis, venit ad recipiendum pecuniam, parceo viatis. As adjectives, assume the nature of nouns when used alone in the neuter termination, so the gerunds in dum, the neuter of participles in das, become substantives, denoting, with of, necessity and obligation, as eundum off mili rite, living must be to me, or I must live well. Jones's Grammar of the Latin Tongue.

GERY, St., in Geography, a town of France, in the department of the Lot, and chief place of a canton, in the district of Cahors, 5 miles N. W. of Cahors. The place contains 1352, and the canton 5355 inhabitants, on a territory of 180 kilometres, in 9 communes.

GERYON, a name given by some of the affected chemical writers to quicksilver.

GERZAT, in Geography, a town of France, in the department of the Puy de Dôme; 4 miles N. E. of Clermont.

GERZEN, a town of Bavaria; 11 miles E. of Landshut.

GESAN, a town of the Arabian Iraq; 8 miles S. E. of Mendil.

GESAS, a town of Sileia, in the principality of Nellie; 3 miles S. E. of Paschau.

GESEKE, a town of Germany, in the kingdom of Westphalia; 9 miles E. S. E. of Lipstadt.

GESERICH, a lake of Prussia, in Oberland, near Dutch Eyau.

GESERVAGHERD, a town of Persia, in Chorfan; 30 miles S. of Esfahan.

GESHEN, Rocks and rivers of; See Amhara.

GESHURITES, in Scripture Geography, a people who dwelt beyond Jordan, in the half tribe of Manassath.
liished the same year, with a very affectionate and consolatory epistle to the father of the author.

The principal works of Conrad Gesner are the following, not to mention various little treatises relating to Botany, or to the Materia Medica, which from time to time came from his ready and prolific pen, some of them accompanying the books he edited for other people.

"Bibliotheca universalis," or a catalogue of Latin, Greek, and Hebrew books, printed at Zurich, 1545, in one volume folio, with criticisms, and often specimens of each. This seems to have given Haller the idea of his own "Bibliotheca Botanica," and "Bibl. Anatomic." "Historiae Animalium," comprised in five books, making three great folio volumes in a very small type, with numerous wooden cuts. The first was published at Zurich in 1551, the last in 1587, after the decease of the author. There is also an edition in German. This is a vast compilation, and critical revision of all that had been done before him in Zoology, with every thing that he could lay of his own knowledge to illustrate the subject, and many incidental botanical, as well as medical remarks. Instead of being the work of a physician, who raised and maintained himself by his practice, and who was cut off in the middle of a most active and useful life, one would suppose it the labour of a recluse, shut up for an age in his study, and never digested from his object by any other cares. This work is arranged according to the plan of Aristotle, only the oviparous quadrupeds are separated from the viviparous. It does not extend to insects or fishes. The former however had not escaped the attention of Gesner, for his labours respecting them make a part of the work of Musset, entitled "Insectorum five Minimorum Animalium Theatrum," published at London in 1634, the earliest book on entomology.

The "Icones Animalium," with their nomenclature, form a separate publication from the above, consisting of the wooden cuts and names only.

"Aquarium Animantium Enumeratio Juxta Plinium," a little 8vo, printed at Zurich in 1556. A list of the German and English names is subjoined.

A little work in Latin, "De Lacte," treating of milk and its preparations, from various authors. Zurich, 1541, in 8vo.

"De Secretis Remedii Thefauros," a Pharmacopeia, which has gone through a number of editions in various languages.

"De varis et admirandis herbis, quae five quod notit lucet, five alia ob causas, Luminarix nomenclatur." A curious and learned little work, with wooden cuts, in 4to. Zurich, 1555. It is accompanied with a description of the celebrated mount Pilat, or Mont Fratius, the northern extremity of the Alps, which Gesner visited in 1555. Several alpine plants are here, for the first time, noticed.

"De omnibus Plathum generis," Zurich, 1565, 8vo. Alfo "De rerum Plathum, Lapidum et Gemmarum maxime figuris," with wooden cuts, more curious than useful.

The botanical remarks relative to the scientific arrangement of plants, on which the supcrominent merits of this great man are founded, are chiefly to be gathered from his letters, which were published after his death. From the number of wooden cuts, and of drawings, which he had prepared, it is probable he meditated a general botanical work, the future arrangement of which frequently occupied his thoughts, and prompted many of these letters.

Gesner married at the early age of 20, for which he was accused of imprudence, but it does not appear that he had any reason to repent. His wife survived him, and notwithstanding the dangerous nature of his disease, which was accompanied with a pestilential carbuncle, she did not desert his death-bed, for he expired in her arms. He left no offspring. His remains were honourably interred, the day after his decease, in the cloister of the great church at Zurich, near those of his intimate friend, Fryius, who died the preceding year. Abundance of Latin, and some Greek verses, were composed to his honour and his life, written by his countryman Jonas Simer, was published in the ensuing year. From this work, and Haller's Biblioth. Bot. much of the above information is derived. Haller mentions Gesner as probably the first person who, being short-sighted, found the advantage of concave glasses. S.

We have received the following additional account of C. Gesner, in relation to his medical profession.

His father, who was a workman in hides, was killed in the Swiss civil war, and left him in such poverty, that he went to Strafsburg, and entered into a situation as a servant. His master, having observed his great inclination to reading, allowed him to employ the time, which was not absolutely necessary to his services, in study; and he made such progress while at Strafsburg, that, having acquired a little money, he went to Paris, where he first attained an ample knowledge of the Latin and Greek languages, and of rhetoric, and afterwards applied to the study of philosophy and medicine: but as he soon found the means of subsistence fail, he was under the necessity of returning to his native country, and of teaching the languages and philosophy for a livelihood. This expedient was successful, and even procured him the means of visiting Montpellier, where he resumed the study of medicine, which he completed, by taking the degree of doctor at Basl in the year 1540. He then determined to settle at Zurich, where his merit procured him the appointment of professor of philosophy, and he discharged the duties of that office, with universal reputation and esteem, during twenty-four years. These duties, and his studies in the cloist, prevented him from entering largely into the practice of medicine; in which, however, his extensive knowledge furnished him with such numerous resources, that his practice was extremely successful, and he rose superior to the prejudices of his contemporaries. Gesner had always a decided predilection for the study of botany, which he early conceived and retained through life, as we have already mentioned in the former part of this article. It was not without great trouble and difficulty that he became a scientific man; for he was of a delicate and sickly constitution; but his spirit and courage gave him strength to support the fatigues of body and mind. Notwithstanding the delicacy of his habit, he traversed the Alps in search of plants; and among other journeys over those mountains, he made one with Jean Bauhin in 1561. He even culled plants from the waters, and has been known to plunge into the lake of Zurich to procure those which grew there. Ever animated by the same spirit, he visited Paris again, travelled through the southern provinces of France, and thence passed into Italy. In order to study the nature of fishes, he went to Venice with a view to investigate those of the Adriatic, and sometimcs afterwards he repaired to Strafsburg to examine those of the Rhine. From these sources of information, from a constant personal observation, combined with the study of the writings of the ancients, he obtained the means of accomplishing that immensity of treatises, which a man, who only attained to 40 years of age, could hardly be supposed capable of producing.

GESNER, JOHN MATTHIAS, was born at Roth, in Anspach, in 1691, where his father was a clergyman. He received the first part of his education at the gymnasium of Anspach, and
and was quickly distinguished by his progres in the ancient and oriental languages. From Anspach he went to Jena, where he exhibited his learning and talents in several publications. In 1715 he was appointed co-rector of the Gymnasium of Wemar, and keeper of the public library. In 1716 he accepted the rectorship of Thomas's school at Leipzig, and on the establishment of the university of Gottingen he was invited to be the professor of rhetoric, an office in which he was so greatly distinguished, as to acquire the reputation of being the most able philologus of the age. He was at the same time made librarian and president of the German society, and to his inspection all the schools of Gottingen were given. On the appointment of the Royal Society at Gottingen he was the first member of the historical chiefs, and was afterwards appointed a counsellor of state, and perpetual director. He died in 1761. His works are much too numerous to be named in this place, but they were such as to entitle him to almost the highest rank in the literary world. Among others may be noted his "Index etymologicus Latinitatis," and his "Theaurus Latinarum et Eruditionis Romanae," 4 vols. fol. Gefner, in this elaborative work, followed the order of Stephanus, but added such notes and other improvements as appeared necessary. These additions confound chiefly in the number of remarkable phrases and passages from the Roman classics, with illustrations. Gen. Biog.

**GESNER, SOLOMON.** was born at Bocklow, in Silesia, in the year 1559. Having received the early part of his education at his native place, he was sent to Brestlaw to pursue the studies necessary to his future profession. From this place he went to Strasbourg, where he was so fortunate as to obtain an academic exhibition for five years, which he employed in the study of philosophy, the mathematices, and the learned languages, as well the Hebrew, Chaldee, and Syrian, as those of Greece and Rome. He now became private tutor to a noble Livonian, and when he was 24 years of age he was admitted to the degree of M. A. In 1592, he was invited to fill the theological chair in the university of Wittemberg, and almost immediately entered upon the duties of his office, and was at the same time admitted to the degree of D. D. He also occupied the important posts of dean and rector of the university, almonor in the ecclesiastical curtilogy, and first preacher in the church. His close application to study injured his health, and he fell a victim to a consumption of diversers in 1605, having only 26 years to the 46th year of his life. His works are a Latin translation of "The Prophecy of Hosea," "Disquisitiones in the Psalms," treating of the dignity, the use, the argument, and the connection of the Psalms, and many other works of a theological and controversial nature. Gen. Biog.

**GESNER, JOHN.** a canon of Zurich, and professor of natural philosophy and mathematics in that university, probably belonged to the same family as the great Conrad. He was the intimate friend of Haller, in whose society he studied at Leyden and Baile, and with whom he maintained a close correspondance during the life of that distinguished man. Their taste for botany was the same, and their characters similar. His letters make an interesting part of the "Epistolae ad Hallerum," and abound with solid and curious botanical criticism and information. He paid much attention to the cryptogamic plants, and other difficult branches of the science, as well as to the anatomy and phytology of plants. He survived his learned friend 12 years, dying in 1705, at the age of 81.

This author published two phylogonic dissertations on plants in 1749 and 1741, reprinted at Leyden in 1743, along with Linnaeus's "Oratio de peregrinatione intra patriam." In these he treats of the life and structure of vegetables, their propagation, sexes, elastic motion of some of their filaments, and their methodical classification. He reviews the experiments and observations of Leeuwenhoek, Malpighi, Grew, Hales, &c. announces the then novel system of Linnaeus, whom, with a kind of prophetic spirit, he calls a man destined to reform all natural history." These dissertations are the best and most comprehensive epitome possible of all the botanical science of that day, in which the improvements of each writer are set in the most just and instructive point of view for their mutual illustration.

With all his knowledge, the subject of our present article, and even his friend Haller, were imposed on by one of the grossest deceptions. A person prefented him with a common meadow Crowfoot, on some branches of which were fluck flowers of the common Daisy. He immediately published, in 1753, a learned dissertation on vegetable monstors, entitled "De Rannuncio bellidifloro," in which he exhibits a figure of this strange anomaly. As Haller had given his sanction to the discovery, botanists could scarcely supposse it was an evident mistake, till for Joseph Banks obtained the original specimen after Gfner's death. On its being freshened with boiling water, in the presence of several botanists, amongst whom was the writer of this, the stem of the "Rannunculus" came out of the pale of the flower, as from a seedling, and indeed the different segments of each went very diligraphous before their separation. A history of the whole is given by Mr. Konig, in his Annals of Botany, v. i. 368, with a plate drawn for Joseph Banks by Mr. Bauer, and signed by all the witneffes.

Gefner published at different times eleven dissertations in quarto, from 1759 to 1773, under the general title of "Phytographia Sacra." Some of the latter only are illustrative of the plants of scripture, the rest being of a general nature, containing various anatomical and physiological, as well as botanical and economical matter. He adopts the Linnean system, and furnishes many remarks confirming the sexual doctrine.

He meditated a very extensive work on the characters of plants, for which he had prepared a considerable number of exquisitely engraved, though too much crowded, plates, some of which are in our hands; but this publication never took place.

He wrote also on extraneous fossils, and compiled an index to Weimann's "Phytographia," printed in 1757 in 8vo. A catalogue of his library for sale was published in 1798, by which it appears to have been one of the best collections of botanical books ever offered to the public. S.

interrupted in the middle. Seed very numerous, minute. 

Gestation is also a term in the Ancient Medicine, used in a chariot, or a boat; or even in rocking him in his bed, if he could not endure a more violent agitation. -

Gesta, in Geography, a town of Switzerland, in the canton of Uri; 15 miles S. of Altorff.

Gestricia, a province of Sweden, about 51 miles long and 10 wide; bounded on the N. by Hellinghard, on the E. by the gulf of Bothnia, on the S. by Upland, Westmanland, and Dalecarlia, and on the W. by Dalecarlia.

The inhabitants do not concern themselves with agriculture, but derive their chief support and wealth from mines, forests, fine lakes, and rivers. The capital of this province is Gofle, which they call Goesten.

Gestungshausen, or Geshhausen, in Geography, a town of Germany, in the principality of Coburg; seven miles E. of Coburg.

Gesture, a motion of the body, intended to signify some idea or passion of the mind.

Quinilian defines gesture, totius corporis motus & conformatio. Gestures are a kind of natural language, which supplies the use of speech in those naturally dumb. The mimics and pantomimes were very great proficiency in the style of gesture.

Gestures consists principally in the action of the hands and face; and may be defined, a suitable conformity of the motion of the countenance, and of several parts of the body, in speaking of the subject matter of the discourse. (See Action.) With regard to oratory, gesture may properly be called the second part of pronunciation; in which, as the voice should be fitted to the impressions it receives from the mind, so the several motions of the body ought to be accommodated to the various tones and inflections of the voice. When the voice is even and moderate, little gesture is required; and nothing is more unnatural and disgusting than violent motion, in discoursing upon ordinary and familiar subjects. The motions of the body should, therefore, rise in proportion to the vehemence and energy of the expression, as the natural and genuine effect of it.

Gestures is either natural, or from imitation. The former denotes such actions and motions, either of the whole body, or of some particular part of it, as naturally accompany our words, just as these result from the impressions of our minds. As to the whole body, it should not continue long in the same position, but be constantly changing, with a gentle and moderate motion. As to the several parts of the body, the head is the most considerable; to lift it up too high, has the air of arrogance and pride; to stretch it out too far, or throw it back, appears clownish and unmanly; too hanging it downwards on the breast, throws an unmanly bashfulness and want of spirit; and to suffer it to lean on either shoulder, argues sloth and indolence; in calm and sedate discourses, the head should keep its natural state and upright posture, occasionally moving, and turning gently, sometimes on one side, and sometimes on the other, as occasion requires, and then returning back to its natural position. It should always accompany the other actions of the body, except in aversion,

...
The passions are principally represented by the countenance; and the several parts of the face contribute to the proper and decent gesture of the whole. In a calm and sedate discourse, all the features retain their natural situation. In sorrow, the forehead and eye-brows lower, and the cheeks hang down; but in expressions of joy and cheerfulness, the forehead and eye-brows are expanded, the cheeks contracted, and the corners of the mouth drawn upwards. Anger and resentment contract the forehead, draw the brows together, and thrust out the lips; and terror elevates both the brows and forehead. To these natural signs of the passions, the orator should endeavour to conform.

The motions of the eyes require the most careful management; because, as Cicero observes, (De Orat. lib. iii. cap. 59.) other parts of the countenance have but few motions; whereas all the passions of the soul are expressed in the eyes by so many different actions, that cannot possibly be represented by any gestures of the body, if the eyes be kept in a fixed posture. Thus, in speaking on pleasant and delightful subjects, the eyes are bright and cheerful; but they fink and are languid in delivering any thing melancholy and sorrowful. In anger, the eyes discover a certain vehemence and intenfeness; in expressions of hatred and detestation, the eyes are turned either aside or downwards; thus Virgil has expressed Dido's retentive and disdainful looks:

"Illa sole fixos oculos avera tenerat."  

The eyes are also sometimes turned downwards, to express modesty; and they should be always turned towards the object which is addresed. A gentle and moderate motion of the eyes is commonly most fittable, whereby they may be directed to some of the audience with an air of respect and modesty; but their motions ought to vary, according to the different nature of the passions which they are designed to discover in the speaker, and convey to his hearers.

The shoulders should neither be elevated nor depressed; a continued motion of the arms should be avoided; their action should be very moderate, and follow that of the hands, which need never be idle: Quintilian lays great stress on the action of the hands, when he says, "The hands, without which all gesture is lame and weak, have a greater variety of motions than can well be expressed: for they are almost equal to our words. Do we not direct with them, promise, call, difcours, threaten, deceive, detest, fear, inquire, deny? Do not they express joy, sorrow, doubt, confession, penitence, measure, plenty, number, and time? Do not they excite enmity, pride, admiration, and shame? That in so great a variety of speech among all nations and countries, this seems to me the common language of mankind."  

As all bodily motion is either upward or downward, to the right or left, forward or backward, or circular, the hands are employed by the orator in all these, except the left; and as they should correspond with our expressions, they ought to begin and end with them. In admiration, and addresses to heaven, they must be elevated, but never raised above the eyes; and in speaking of things below us, they are directed downwards. Side motion should generally begin from the left, and terminate gently on the right; in demonstrating, addressing, and on several other occasions, they are moved forward; and in threatening, sometimes thrown back: when the orator speaks of himself, his right-hand should be grafted on his breast. When no other motion is necessary, the hands should be kept about as high as the breast, so as to make nearly a right angle with the arm. They should never be suffered to hang down, nor to rest upon the cushion or bar. The left-hand should never move alone, but accommodate itself to the motions of the right: in motions to the left, the right-hand should not be carried beyond the left shoulder; in promises and expressions of compliment, the motion of the hands should be gentle and slow; but in extortations and applause, more quick. The hands should be generally open; but in expressions of compassion and anger, they may be closed. Neither the breast nor the belly should be thrust out; the trunk should be easy and flexible, fitting itself to the motions of the head and hands; and the feet should be kept steady.

There are other gestures, which arise from imitation, as when the orator describes some action, or performs another speaking: but here he should be careful not to overact his part, by running into any ludicrous or theatrical mimicry, or changing his action or voice in a manner unfittable to his own character. See farther on this subject, Ward's Oratory, vol. ii. p. 344, &c. p. 362, &c. Sheridan's Lects. on Eloquence, lec. vii. p. 113, &c. See also Action, Imitation, Pronunciation, and Voice.

Gestus Bonus, in Law. See Good Nature.

Gesvaldo, in Geography, a town of Naples, in Principato Ultra; 13 miles N.W. of Conza.

Gesves, a river of Africa, which runs into the Atlantic, a little to the north of the island of Bifagos.

Gesula. See Gezula.

Geta, Septimus, in Biography, second son of the emperor Severus, and brother and partner of Caracalla, was born at Milan in 189, and was raised to the title of Augellus. In the eighth year of his age he was moved with compassion at the fate of some of the partisans of Niger and Albinius, who had been ordered to be executed, and his father, struck with the humane feelings of his child, remitted the sentences. Though he was not free from the vices of an heir to the empire, yet the mildness of his disposition made him a greater favourite with the people than his brother, and this circumstance inflamed their mutual hatred. On the death of Severus both princes succeeded to a joint sovereignty, but their union was of short duration. Caracalla, jealous of his brother's popularity, ordered him to be poisoned, and when he found the infamous act could not be effectual, he murdered him with his own hands in the presence of his mother Julia, who, in the attempt to defend her favourite son, was severely wounded in the arm by Caracalla. Gete had not reached the twenty-third year of his age when he felt a victim to the brutality of his brother. Before his death, Severus had, in the anguish of a disappointed father, foretold that the weaker of his sons would fall a sacrifice to the stronger, who, in his turn, would be ruined by his own vices. Univer. Hist. Gibbon's Rom. Hist. See also the article Caracalla.

Geta, in Geography, a town of Sweden, on the N. coast of the island of Alman. N. lat. 60 25'. E. long. 9 52'.

Getae, or Getes, a tribe of Scythians, who, according to Herodotus (I. iv.), inhabited that part of Thrace which is near the Iler or Danube. Strabo says (I. viii.) that they had the same language with the Thracians, and he represents them as occupying those arid and uncultivated plains which lie along the sea-coast between the mouths of the
the Ister and that of the Tyras, in which the army of Darius, in its march against the Scythians, was in danger of perishing for want of water. Pthie (l. iv. c. ii.) says, that they inhabited that declivity of Mount Hemus which is turned towards the Danube. Under the empire of Trajan, the Gete were subjected to the Roman dominion. Herodotus speaks of Zamboks as the legislator of the Gete; and he says that from him they derived the dogma of the soul's immortality; and Trajan attributed to this principle the inviduity with which they encountered death in the perils of war. The Gete possessed only a small space along the coast, but their territory extended to a considerable distance in the interior of the country. Those who inhabited the western part in ascending the Danube, were called "Dacians." But those who were more appropriately denominated Gete, occupied the eastern parts near the Euxine sea; and those who inhabited the banks of the river Tyras, were called "Tyrigetes." They had all the same language. Those people were continually intermixing themselves with the Scythians, Balts, Thracians, and Thracians. The Gete were without doubt the same people with those who were called Gotti, and whose migrations were so extensive. See Gottis.

GETCHAO, a town of China, of the third rank, in Chang-tong; 27 miles E.S.E. of Lo.

GETE, part of the country of the Eluts, in Chinese Tartary, so called even to the time of Timur, is regarded by some geographers as the country of the ancient Maffage, towards the lakes of Palkari, Balhak or Tengis, and Zaizen. The contafch, or great Khan, used chiefly to reside at Hacres, or Erts, on the river Il, which flows from the S.E. into the lake of Balhak. See Jatts.

GETHSEMANE, in Scripture Geography, a village in the mount of Olives, whither Jesus sometimes retired, and in a garden of which he endured his agony, and was taken by Judas. Matt. xxvi. 36 &c.


Gen. Ch. Cal. none, except an obliquely truncate cylindrical fleshy. Cor. of one petal, superior; tube very long, thread-shaped; limb widely spreading, regular, in six deep, elliptical-oblong, equal segments. Stam. Filaments fix, inserted into the mouth of the tube, shorter than the limb, often divided; anther linear, vertical, rolled inwards, often two to each filament. Petic Germen inferior; style simple, capillary, longer than the flaments; stigma capitate. Petal. Berry club-shaped, obtuse, radical, sessile on the bulb itself, somewhat fleshy, of one cell. Seeds imbedded in pulp, globose, smooth, lying over each other in a triplicate series.


Obf. Linnæus, misled by the occasional luxuriance of the flowers, placed this genus in the class Dodecatulria.

Four species are defined in Willdenow, besides his and Jacquin's G. phaca, Hort. Schoenbr. v. i. 42. t. 80, which is Hypoysis phaca of Linnæus, and we are at a loss to discover why it is removed to Gethyllis, for which no reason is given, nor does the description in Jacquin foggest any, except the length of the tube. The fruit, when known must decide this question.

G. floribunda. Roxb. Corom. v. i. 61. t. 87.—Native of forests on the coast of Coromandel, where it was first noticed by Kenig, flowering in February and March. The stem is woody and climbing, with long, round, leafy branches, downy like the whole plant. Leaves opposite, falcate, ovate, acute, entire, about two inches long. Flowers in axillary and terminal, compound leafy clusters, with opposite flanks, inodorous, greenish-white. Seed and permanent calyx of a milky hue. The natives call this shrub Band-bey-mooroodooe.

We have no doubt of the propriety of Lamarc's fynom, which our lamented predecessor, the Rev. Mr. Wood, not knowing the Gethizia, could scarcely ascertain. (See Calycoperis.) If we be right, the main branch in Lamarc's plate is diminished, the separate fruits only, and permanent stamens, being of the natural size.

GUTTYSBURGH, in Geography, a small post-town of America, in the state of Pennsylvania and Adams county, situated at the head of Rock creek, one of the head-waters of the Monococy; containing about 30 houses; 9 miles N. of the Maryland line, and 118 W. by S. from Philadelphia.

GETZENDORFF, a town of Austria, seated on the river Kaffencoph; 12 miles S.E. of Vienna.

GEVAI, a town of the Arabian Irak, on the Tigris; 95 miles S.E. of Bagdad.

GEVAUDAN, a mountainous country of France, so called
call'd before the revolution, situated in Languedoc; of
which Mende was the capital.

GEVES, a town of Africa, situated on a river of the
same name, S. of the river St. Domingo.—Also, a town of France,
in the department of the Lower Meuse; 5 miles N. of
Wyck.

GEUM, in Botany, is mentioned by Pliny, though we
learn nothing from that author respecting the derivation
of its name. Ambrozinus conjectures that it comes from γεως,
to be flanged, because its beautiful flowers and seeds are the
boat and glory of the Alps.—Avens, or Herb-bennet.—
Lamarck. Illust. t. 443. Mart. Mill. Dict. v. 2. 6m. Pl.
t. 151. Lamarck. Dict. v. 1. 596.) Clafs and order, Ico-
formia Polygynia, Nat. Ord. Semilonga, Linna. Rapha-
Is.

Gen. Ch. Cal. Perianth of one leaf, in ten segments, ra-
ther upright: the alternate segments very small, acute. Cal.
Petals ovate, round, clawed narrow, the length of the
calyx, into which they are inserted. Stem. Filaments nu-
merous, awl-shaped, of an equal length with the calyx, and
inserted into it; anthers short, broad, obtuse. Pist. Ger-
nerous, numerous, collected into a head; styles inserted into
the side of each germen, hairy, long; stigma simple. Peric.
none; common receptacle of the seeds oblong, hairy, placed
on the reflexed calyx. Seeds numerous, compressed, rough; each
tipped with the long geniculate style.

Seeds with a jointed awn. Receptaculum columnar.

Only five species of 
Genus are described by Linnaeus in
the last edition of his Species Plantarum, though in Willde-
now's edition we meet with eleven of this genus, of which
number G. urbiunm and rivale are the only British ones, and
to which we are enabled, by the assistance of Dr. Smith,
to add two nondecripts from his herbarium.

ulas rounded and cut. Flowers erect. Awns of the feeds
hooked, naked.—Frequent in woods and hedges, perennial,
flowering from May to August. The root is fibrous, and
flavily aromatic. Stem erect, about two feet high, branched
at the upper part, clothed with deflexed hairs. Leaves un-
equally ternate, hairy, lobed and cut. Stipulae very hairy.
Flowers terminal, solitary, erect, yellow, with petals shorter
than the calyx. Seeds rather hairy, with naked purplish
awns.

t. 106. — Radical leaves lyrate. Stipulas ovate, acute,
cut. Flowers drooping. Awns twisted and feathered.—
Found in meadows and moist woods more commonly than is
usually imagined, perennial, flowering in June and July.
Root spreading, woody, altrigent and aromatic, sometime
of use in intermittent fevers. Stem about a foot high, droop-
ing at the top. Lower lyrate, or confluent pinnate, fer-
rated, hairy. Petals erect, never fully expanding. The
general appearance of this elegant species, an universal favourite
amongst botanists, is thus justly described in English Botany,
"the rich combination of the dark-green wrinkled leaves,
with the glowing red-brown of the stem and calyx, and the
naturally delicate colour of the petals, added to the graceful
position of the flowers, render this one of the most pict-
refsque of our native plants."

(G. canadens; Jacq. Hort. v. 2. §2. t. 175.) — Stem
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leaves ternate; the upper ones lanceolate. Stipulas oblong.
Flowers erect. Awns of the feeds naked, hooked.—
Native of North America, from whence it was introduced by
Mr. P. Miller in 1739. It is fairly allied in habit to G.
urbium, but the petals, which are shorter than the calyx,
are white, and the whole plant is of a greener hue. Its
leaflets are also more attenuated towards the base. Its
flowers in June, and is a hardy perennial. Root inodorous. Rad-
cial-leaves generally bipinnate. Seeds smooth.

1113. (G. stylites; Jacq. Jard. v. 1. 10. t. 93.) —
"Stem-leaves pinnate; leaflets and stipulas claven and cut.
Flowers erect. Petals longer than the calyx. Awns of the
seeds naked, hooked."—Native of North America. A
hardy perennial, flowering in June and July. Flowers
yellow. Fruit hairy. The whole plant is covered with
whitish hairs.

"There is no figure of this species, which is perennial,
and grows in Japan. Stem round, rather more than a foot
high. Flowers terminal, with petals as long as the calyx.
Seeds ovate, covered with greyish hairs.

1115. (Caryophyllata pyrenaica, amplissima et rotundobor
folio, mutante flore; Tourn. Inf. 295.) — "Flowers drooping.
Petals longer than the calyx. Awns hairy, twisted at the
base."—This is taken up by Willdenow from Tournesort,
and is perennial, found on the Pyrenees. Its appearance
is similar to G. rivale, but differs in the larger size of its
radial leaves, and shape of its awns, which are thinly covered
with hairs, and naked at the top. Stem erect, about a foot
and half high. Seeds very woolly.

pl. v. 2. 1116. Desf.-Atlas. v. 1. 402. — Lower-
leaves pinnate. Stem generally single-flowered. Fruit hairy.
Awns twisted.—A native of Mount Atlas, perennial.
Stem nearly two feet high, simple. Stipulae large, ovate,
cut. Flowers yellow. This is nearly allied to G. montana,
but differs in having fewer leaflets, a taller stem, and twisted,
not bearded, awns.

v. 2. 1116. (Dryas georgie; Jacq. Hort. v. 3. 53. t. 68.) —
"Leaves pinnate, toothed. Stem with about two flowers.
Calyx of the fruit erect. Awns straight, naked."—Native
of the mountains of Siberia, and introduced into Kew gar-
dens in 1780 by Dr. Pallis. We have it from Chelsea gar-
den. It flowers in June, and is a hardy perennial. Root
inodorous, but with an aromatic taste. Petals yellow, Larga-
than the divisions of the calyx. Seeds 
with long awns.

pl. 717. Jacq. Aud. v. 4. t. 573. — "Leaves pinnate,
hairy; the outer leaflet very large, round; the lower ones
regularly degrading. Stem single-flowered. Awns upright,
flaggy."—This, and the following species (G. repens) are
found most abundantly on the highest alps of Austria and
Switzerland, where they are extremely ornamental during
the months of July and August. Mount Conis is deftended
by travelers as a favourite habitat of these beautiful plants.
The root of G. montana is fibrous, aromatic, and sometimes
indistinct. Stem round, leafy, from three or four inches to
a foot in height, erect, generally single-flowered, simple.
Petals round, yellow, longer than the calyx. Seeds oval,
brown, with a long feathery awn.

Jacq. Aud. v. 5. 33. t. app. 22. — "Leaves pinnate, cut,
hairy,
GEU


Awns upright, flaggy. — Place of growth and time of 

flowering same as in the preceding species. Root yellowish. 

Runners long, reddish. Flower-folks erect, reddish, flaggy. 

Petals five or eight, sometimes ten, large, yellow. Seeds 

retaining the style, which is broken off in the middle and 

looks like a jointed awn. 


v. 2, 1117. — Leaves pinnate, smooth; leaflets wedge- 

shaped, toothed at the top. Stem single-flowered. Awns 

upright, flaggy. — There is no figure of this rare species 

extant. Willd. has very properly reduced it to Geum, 

though the plant was formerly known as Dryas pentapetala. 

(Linn. Sp. Pl. 717.) Native of Kamtschatka. Root per- 

renial, throwing out filiform, woody creepers. Stipules nar- 

row. Petals five, large, round, white, spreading. Seeds 

turned, tipped with a hairy awn, and longer than the 

flower. It appears by the Linnaean Herbarium to be a very 

elegant species. 

12. G. parviflorum. Small White Avens — Radical leaves 

lyrate, taller than the stem. Stipular cut. Flowers nearly 

sefille. Petals shorter than the calyx. Awns feathery. 

Gathered by Commerson in the straits of Magellan. 

The radical leaves are interruptedly lyrate, hairy, bluntly 

cut and crenate, about three inches long, most resembing 

those of G. rivale. Stem solitary, scarcely two inches high, 

clothed with short dense hairs, and bearing two or three 

terminal wedge-shaped leaves, and as many small, nearly se-

fille flowers, which appear to be somewhat drooping, but 

this can scarcely be determined by the dried specimen. 

Petals, said by Commerson to be white when fresh, are 

smaller than the segments of the calyx. Geum hairsy 

G. rivale. 

13. G. colchisphium. Marsh-marigold leaved Avens — Ra-

dical leaves kidney-shaped, almost circular, sharply crenate; 

on flabby leafy stalks. Calyx turbinate, with lanceolate 

segments. Awns hairy — Gathered by Mr. Menezies on 

the west coast of North America. — This is remarkable for 

the resemblance of its radical leaves in shape and size to those of 

Colchis phylleis, except their being slightly hairy, and their 

long toothed leaves being furnished with a few little oblong or 

three-lobed leaflets, indicating an approach to a lyrate leaf 

altogether. Stem above a foot high, erect, bearing three or 

four smaller, little rounded leaves, more deeply crenate or 

cut, and terminating in about three flowers, on flabby stalks. 

Calyx hairy at its base, turbinate; its segments oblong-lan-

cescent, obtuse, at length erect, the larger ones equal in 

length to the petals which are yellow and broad, like those 

of a common Crowfoot. Awns straight, bluntish, hairy in 

the lower part, possibly becoming hooked at an advanced 

period. 

GEUM Urticum, in the Materia Medica, is a common 

British plant, called Aow, in woods and hedges, flowering 

from May till August. The root, which is the part medi-
cally employed, has an aromatic and somewhat afflicting 
taste, and a pleasant smell of the clove kind, especially 

when it is produced in dry and warm soils. It gives out its 

afflicting matter equally to water and spirituous menstrua; 

but its aromatic part most perfectly to the latter. In di-

tillation with water it yields a small quantity of whitish con-

crete oily matter, of a very grateful fragrance. This plant, 

though little used in the Continent, is held in great estimation 

for various virtues on the continent; but the character, under 

which it has been received since the year 1582, is that of a 

febifage; many illnesses having been adduced of its ef-

terces in obsolete incumens, after the Peruvian bark 

bark had failed. It is said that a tincture of the roots, made in the 

proportion of four ounces of the root digested with a quart 

of brandy in a sand heat, and given in the quantity of half 

an ounce or more, two, three, or four times a day, seldom 

fails to cure agues. Others have given it with equal success 

in decoction, powder, or electuary, in the proportion in 

which the Cinchona bark is commonly employed. This 

root has also been found useful in several chronic disorders, 

as a general tonic and afflicting; and experiments made by 

Buehle have evinced its antifeptic power to exceed that of 


GEWOLJUNG, in Geography, a town of Austria; eight 

miles S. of St. Polten. 

GEVREY, a town of France, in the department of the 

Côte d'Or, and chief place of a canton, in the distri-

ct of Dijon; 7 miles S. of Dijon. The place contains 

1128, and the canton 7894 inhabitants, on a territory 

of 260 kilometres, in 36 communes. 

GEVUNA, in Botany, a barbarous Chili name, adopted 

by Molina. — Jaff. 424. — Claws and order, Didynamia 


Gen. Ch. Cal. none. Cor. Petals four, placed cross-

wise. Stem. Filaments four, two of them very short. 

Pist. Germen superior, simple; style one; stigma thickish. 

Pet. Capule nut-shaped, corticious, of one cell. Seed foli-

tary. A tree, native of Chili, where Dombey and Molina 

have gathered it. The leaves are pinnate, composed of 

four or five pair with an odd one. Flowers terminal, 
situated, two together, many of them abortive. Fruit 

etable, like a hazel-nut, whence the Spaniards call it Acetabul. Seed 

descriptive of albumen. Capule much like that of the Cala-

philois, Jaff. 

GEWUS, JOHN MICHAEL, in Biography, was born in 

Holstein in 1735. His father undertook the care of his 

education, and found in his son a turn for mathematical and 

philosophical pursuits, which he encouraged, and by 

which he became distinguished, and was chosen professor of 

the mathematics in the university of Copenhagen. His 

principal work was the "Theory of the Art of constructing 

Mines," in the composition of which he was assisted by the 

MSS. of Defor, which he had the good fortune to 

obtain, though they had been suppressed in France, after the 

death of that able engineer. He published also a "Treatise 

on the Art of constructing Mines." He gave a translation 

in the German language, from the Danish, of Olafsen 

and Povelsen's voyage to Iceland, which was printed in 

two volumes 4to. He lent several valuable papers to Brehm's, 

Ingenieur-und-Artillerie Magazin, and published a set of 

logarithmic tables. 

GEUTZ, in Geography, a town of Germany, in the 

duchy of Anhalt-Cöthen, near Cöthen. 

GEWICZE, Gcwtz, or Gewitz, a town of Moravia, 

in the circle of Olmutz; 24 miles west of Olmutz. N. 

lat. 49° 47' E. long. 16° 35'.

GEWOLD, CHRISTOPHER, in Biography, flourished in 

the seventeenth century. He was one of the able coun-

sellors of Maximilian, first elector of Bavaria, who confided to 

his care the archives of the duchy, in order that he might 

make use of them as an historian. His works relate chiefly 

to the history of his own country; of these we may men-

tion "Genalogia Serenissimorum Bojaric Ducec, 1623;" 

"Chronicon Monasterii Reicherpergenii." "Delinatio 

Norici veteris, ejusque Continuam;" and "Commentarius de 

Septem viratu Romani Imperii," Moreri. 

GEX, in Geography, a small territory of France, in 

the eidevant province of Burgundy, extending from Fort 

d'Ecluse to the village of Croissy, and from the town of 

Gex to Geneva, being seven leagues in length and three in 

breadth,
GEZ

breath, watered by the Rhine and other streams, and bounded on the west by mount Jura, which yields excellent pastures. The principal articles of trade are cheese, wine, and coal. It now forms a part of the department of Lake Leman.

Gex, a town of France, in the department of Leman, and chief place of a canton, in the district of Geneva, situated at the foot of mount St. Claude; 9 miles N. N. W. of Geneva. The place contains 2,614, and the canton 9,299 inhabitants, on a territory of 212 ½ kilometres, in 14 communes. N. lat. 46° 20'. E. long. 6° 8'.

GEYER, a town of Germany, in the circle of Erzgebirg, situated in the midst of mines, and having manufactures of vitriol, sulphur, alum, and arsenic; 6 miles S. W. of Wolkenstein.

GEYERSBERG, a town of Bohemia, in the circle of Konisingrätz; 28 miles E. N. E. of Chrudim.

GEYRACH, a town of the duchy of Stiri; 9 miles S. S. E. of Cilley.

GEYS, or GEYS, a town of Germany, in the bishopric of Fulda, situated on the Ulter; 15 miles N. E. of Fulda. N. lat. 50° 43'. E. long. 10°.

GEYS Rucken Jaffeek, a mountain of Germany, which separates Upper Carniola from the county of Cilley; 6 miles N. E. of Stein.

GEYSZING, New, a town of Saxony, in the margraviate of Meifen; 12 miles S. E. of Plihutz.

GEZAL, a town of the Arabian Iraq, on the Euphrates; 120 miles W. N. W. of Baffora.

GEZAN, or Djezen, a sea-port town of Arabia Felix, in the principality of Abu-Arish (see Abu-Arish); 23 miles W. of Abu-Arish, the capital of the principality. This province of Gezah, situated on the Arabian gulf, and in a fertile country, carries on a considerable trade in lamma, of which great plenty is furnished by the circumjacent territory, and also in coffee, which is brought hither from the mountains of Hafshid-u-Bakil. It has a trade likewise with the ports on the opposite side of the Arabic gulf; but has no intercourse with the subjects of the Imum.

GEZEID, a town of Egypt, on the right bank of the Nile; 27 miles N. N. W. of Cairo.

GEZIRA, or Jassera, a town of Asiatic Turkey, and capital of a pashalic, in the province of Diarbekir, on the right bank of the Tigris. The whole province of Diarbekir is also called "Al Gezira;" 75 miles S. E. of Diarbekir. N. lat. 37° 16'. E. long. 40° 42'.

GEZIRA CUBROS, in the Materia Medica of the Ancients, a name given to a taw by Avicenna, Serampon, and others. These authors do not give any explanation of what sort of substance they mean by this name, but seem to suppose it a thing universally known, and only give a hint of its qualities.

GEZIRAT AL DAHAB, or Gezirat Iddตลอด, or the Golden Island, in Geography, an island in Lower Egypt, formed by canals cut from the left bank of the Nile, opposite to Faoon.

GEZIRAT AL TËRR, or Island of Birds, an island in the Red sea. N. lat. 23° 18'. E. long. 37° 56'.

GEZULA, or GESSULA, an inland province of the empire of Morocco, E. of the province of Suez, and N. of Ville de Nen; this, together with the province of Dra, lies in the vicinity of mount Atlas which, in this southern part of the country, extends almost to the sea. The inhabitants of this province are considered as the most ancient people of Africa. The country produces a great quantity of barley, and affords pasture for cattle; it has mines of iron and copper, of which are made various utensils, that are exchanged for cloth, spices, horses, and other necessaries. It has every year a fair, which lasts two months, for the sale and exchange of cattle and merchandize in general. The people are free, being allies rather than subjects of Morocco. Their arms consist of fabes, large sharp two-edged swords and lances. They are numerous, but have no towns, and they generally live in camps and villages.

GFOILL, a town of Austria; 8 miles W. N. W. of Crone.

GHALESA, a town of Arabia Felix, which was once a famous city and sea-port, but now sunk into decay, about 20 cottages only remaining to show the place where it stood, and the inhabitants are provided only with dates, and the milk of a goat to drink; 20 miles S. of Hodeida.

GHALGHULUWA, in Zoology, the Ceylonese name of a species of Earl Indian serpent, a mace of a pale brown, variegated with transverse streaks of white, and found among rocks and stones.

GHAN is a name given in Mucfory to caravanserai.

GHANA, as Edfrid and Abulida call it, or GHINNY, in Geography, a city and capital of a kingdom in Africa, situated nearly midway between the Indian sea and the Atlantic on the E. and W.; and between the Mediterranean and the Ethiopian seas on the N. and S.; and, therefore, considered by major Renell as the point on which the oriental and eurpian positions depend. This country lies on the borders of the Neel-Aheed, or Guin river, and is bounded on the N. by Caffa or Kaffina, on the E. by Wangara, on the S. by Melli or Lambe and on the W. by Mezkara and Kaffina. The city is placed in Renell's map on the north bank of the river. According to Edfrid, Ghana is distant 37 journeys (each day's journey of Edfrid being about 1926 geographical miles) from "Germā," through Agadez, or Agadoff. Ghana is an ancient and ruined city of Fezzan, about four journeys E. S. E. of Mouzourzouk, in N. lat. 27° 25'. E. long. 16° 20'. Agadez is 25 of Edfrid's journeys from Ghana, being by W. or S. S. W. from the capital of Fezzan. Ghana is 12 days of Edfrid's scale to the southward of Agadez, or about 229 geographical miles. It appears that Ghana lies somewhat to the east of the line which passes through Agadez from Germa, and Mr. Mathew has taken 700 as the general line of distance from Germa to Ghana. Mr. Mathew was told, at Morocco, that Ghinny (Ghana of Edfrid) was 40 journeys from Kabora, the port of Tombuctoo, along the bank of the Niger. These, taken at the caravan rate between Fezzan and Egypt, Morocco and Jarras, &c. that is, at 150 per day, produce 6522 geographical miles. The restriction of this line with that from Germa places Ghinny in N. lat. 16° 10'. E. long. 13° 21'; in which position it stands at 750 miles from the city of Benin, on the coast of Guinea. For the further settlement of this important point in adjusting the map of Africa, see Renell's Proceedings of the African Association, p. 119, &c.

GHANARA, a city of Africa, the capital of Wagara, situated on a river, which runs into the Niger, or rather into a lake (the Lybia Palms of Ptolemy) formed by the Niger. N. lat. 13° 40'. E. long. 15° 40'.

GHASSA, or GAMA, capital of a district in the northern part of Butten, in the East Indies, and the station of a zoonoom, or provincial governor. The highest mountain in its neighbourhood, whose head is eternally covered with snow, sends forth a spring of water at its base of so great a degree of heat, that few are found capable of bearing, even for a short time, any part of the body immered in it. It is situated near the spring-head of Pathick river. N. lat. 27° 53'. E. long. 89° 18'.
GHENT, a small island in the river St. Lawrence. N. Lat. 43° 26'; W. long. 93° 26'.

GHAZAN, a town of Persia, in the province of Iran; 25 miles E. of Isphahan.

GHAZAN. See GEBAN.

GHEBAHRA, a town of Persia, in the province of Isphahan; 15 miles N.W. of Isphahan.

GHEBI, a town of Italy, in the department of the Hela; 10 miles S. of Brescia.

GHEDEMIC. See GARAMIS.

GHEDEA, a town of Asia Minor, in the government of Sivas; 15 miles S. of Amasya.

GHEDEMAN, a town of Persia, in Chebar; 18 miles S. of Herat.

GHEIRA, a town of Asia Minor, in Natalia; 38 miles N.N.E. of Mocha.

GHELIVE, a town of Asia Minor, in Natalia; 20 miles E.N.E. of Mocha.

GHELIA, a town of Asia Minor, on the coast of the Red Sea, anciently called "Odessa," 48 miles S.S.E. of Mocha.

GHELEN, SIGMUND, in Biography, was born of a respectable family at Prague. When he had attained to a proper age for improvement by foreign travel, he went into France and Italy, and acquired an accurate knowledge of the languages of those countries. On his return he joined through Belf, and made himself known to Eratosthenes, at whose recommendation Ptolemy engaged him as his corrector of the press, by which he gained a small but competent maintenance. He soon attained a higher office than that of corrector of proof-sheets, and joined to it the duties of a critic and translator. He published a dictionary of the Greek, Latin, German, and Dalmatian languages; and annotations upon Phylae and Livy. He translated from the Greek into Latin the Antiquities of Josephus, some Homilies of Chrysostom, and many other learned works. Just before his death, which happened in 1554, he had employed his talents on, and nearly finished, a version of Justin Martyr's works. Besides those already mentioned he was editor of many other works. He was acute and ingenious, and wrote with elegance and fluency. In his private character he was mild and placable, simple and sincere. Moretti.

GHEMAR. See GEMARA.

GHEME, in Geography, a town of Italy, in the department of the Gonia; 13 miles N.W. of Novara.

GHEMIS, a town of Asia Minor, in the government of Sivas; 24 miles W. of Amasya.

GISUNA. See GISUNA.

GHENT, a city of France, and chief place of a district, in the department of the Scheldt, formerly capital of Austrian Flanders, situated on the confluent of the rivers Scheldt, Léie, Meuse, and Lieve, which, together with a number of canals, intersect it in a variety of directions, and divide the town into 26 small islands. It is encompassed by walls about 15 miles in circumference, and includes gardens and corn-fields. Since the French revolution it has been divided into four quarters, viz. North, South, East, and West, and as many cantons. The former contains 15,000, and the corresponding canton 17,454 inhabitants, on a territory of 223,000 square miles, in two communes; the second, or south, contains 16,000, and its canton 16,499 inhabitants, on a territory of 35 square miles, in two communes; the third, or east, includes 15,000, and its canton 16,073 inhabitants, on a territory of 35 square miles, in three communes; and the fourth, or west, contains 13,000, and its canton 13,319 inhabitants, on a territory of fifteen square miles, in three communes. This city was first chosen for their habitation by the Nervii, and afterwards occupied by the Vandals, who gave it the name of "Wanda," whence the present appellation of Gand, or Ghent, is supposed to be derived. It was encompassed with walls by Odosceus, grand monarch of Flanders, and has since been frequently enlarged, particularly in the year 1397, by order of Philip the Bold, 25th count of Flanders. The inhabitants were always warlike, and often engaged in military contests with their own princes, and with their neighbours, which were conducted in many instances with savage cruelty, and terminated in extensive and formidable slaughter. Ghent was the birth-place of Charles V., of whose nativity in their town the inhabitants had little reason to boast, as he loaded them with frequent and heavy impositions, chafed them with rigour for their occasional revolts, and subjected the magistrates and several of the chief citizens to the most humiliating treatment. This conduct on his part inflamed their disposition to revolt, and the consequence was, that one of the small cities in Europe was reduced to a state of perfect solitude. However, it afterwards regained four small portions of its ancient splendour, and became, at least previously to times of recentconfusion, confederable. In November 1576, was concluded in this city the famous treaty called the "Treaty of Ghent," containing 25 articles, and amongst others, granting them full power for settling that the Spanish and foreign troops should leave the country, that the provinces of Holland and Zeeland should remain united with the others, that the Catholic religion should be maintained, and that the ancient privileges of the country should be secured; and this treaty was approved and ratified by Philip II., king of Spain. In 1678 Ghent was taken by Louis XIV., king of France, but restored to Spain at the treaty of Nimègue in the same year; and it remained in their possession till it was taken by the allies in 1706, after the battle of Ramillies. It was seized by the French in 1708, but recaptured by the allies under Prince Eugene and the duke of Marlborough, in the same year. Ghent was erected into a bishopric in 1559 by pope Paul V., at the solicitation of Philip II., king of Spain, subject to the archbishop of Malines. It had, besides the cathedral, six parish churches, and many religious houses; some of the streets are broad and well-paved, and the market places spacious, in the midst of one of which is a statue of Charles V., in his imperial habit. Ghent carries on a considerable trade in cloths, linen, lace, and silk manufactures, and is much admired, in favourably times, by two navigable canals; one to Saxe-Ghent, and another to Briggs, Olen, &c. The magistracy consists of burgomasters, ceucons, and common-council. John, the third son of Edward III., king of England, was born in this city, and from this circumstance called John of Gaunt. In November 1572, the French took possession of this city, but evacuated it on the retreat of Damourier; however, they afterwards regained it in their progress through the country: 30 miles S.W. of Antwerp. N. lat. 51° 3', E. long. 3° 43' 20".

GHER, a town of Africa, in the county of Suldumfia, or Sisiliaa, on the Ziz, near mount Atlas; 90 miles N.W. of Suldumfia.

GHERANGOL, a town of Africa, in the country of the Poulohs, on the S. side of the river Senegal. N. lat. 14° 40', W. long. 14°.


But neither of these canoes produces the effect ascribed to them. Vaillant supposes that it is a mark of distinction, adopted by their ancillors, when at war with neighbouring nations, by which they might know one another; but that account is no less fanciful and improbable than any other. Whatever is the cause from which this practice originates, it is performed by the father, commonly at the birth of the child; though it is sometimes deferred till the child has completed his third year.

GHEZ, a town of Grand Bucharis; 24 miles S.S.E. of Balk. N. lat. 36 16'. E. long. 65 40'.

GHEZAN. See GEZAN.

GHEZZI Pier Leone, called Cavaliere Ghezzii, in Biography, a painter who was a pupil and imitator of Pietro Cortona. He was selected with Luigi Trevianni, and other artists of the same style, to paint the prophets in St. John Lateran; and executed many other works of less consequence, but he obtained most celebrity by his skill in caricature, which he freely indulged.

GHIABUNDER, in Geography, a town of Bengal; 25 miles S.S.W. of Gorapat.

GHELIELNS. See GHELIELNS.

GHiCKERS, an appellative given to those who inhabited the northern and largest division of the hilly tract situated between the Belaut, the Sinde, and Cabhmore, in Hindoostan, by way of contrast to the Jauds, who occupied the southern and least division.

GHIDORE, in Geography, a province of Bengal, bounded on the N. by Bahar, on the N.E. and E. by Curruckpore, on the S. by Birkoon, and on the S.W. by Curricolede and Moy. The chief place is Ghidore; which is 70 miles S.E. of Patna. N. lat. 24 51'. E. long. 86 23'.

GHIETZ, a fortress of Persia, in the province of Irak, taken by the Afghans in 1723.

GHIILAN, or KILAN, synonymous with the ancient Gela, a province of Western Persia, bounded on the N. by the provinces of Aderbajian or Anderbeizaun and Schirvan, on the N.E. by the Caspian sea, on the E. by the Caspian sea and the province of Mazanderan, on the S. by the Persian Irak, and on the W. by the provinces of Aderbajian and Curdisun; about 200 miles from E. to W., and 150 from N. to S. This is one of the most beautiful and fertile provinces of Persia, producing silk, olives, rice, tobacco, and most excellent fruits of all kinds, and in such abundance, as not only supply the wants of its inhabitants, but sufficient to provide for a great part of Persia and Armenia. The manufactures and silk of Ghiilkan are esteemed the best in Persia, and have been in such repute for many years, that Ralfid, its capital, is become one of the first commercial towns in this part of Asia. The small fort is usually white, and chiefly built into the interior cities of Persia, or sold to the Turks; the interior kind is yellow, and principally disposed of to the Rullians. Ralfid supplies the bordering provinces of Persia, and the independent neighbourine states, as far as Georgia, with European merchandise, except the goods which are transported immediately from Anfiran, through Kilker and Metsko, to the nearly part of Georgia, and of the neighbourine mountains; and those sent from Shamakake to the Lignje Tatars, and other independent tribes. In this province are seen whole forests of mulberry, box, and walnut trees. Every peasant has a garden to his cottage, planted with orange trees, citrons, figs, and vines. For a further account of the trade and government of this province, we refer to the articles Caspian Sea and Persia.

GHELIELNS. See GHELIELNS.
no rival, except Hidæst, khan of Ghilan, whom he forced to fly from Rahîl or Rahad, his place of residence, and who was killed near the port of Simîlî. In consequence of these events, Asûtî became monarch of the whole of Western Persia, and having been made an emir in his infancy by order of Nadîr Shâh, he nominated for his successor his nephew Baha Serdar.

GHILDI, a town of Africa, on the Senegal; 30 miles N.W. of Gallam.

GHILON, a town of Cardifian; 30 miles S.S.W. of Erbil.

GHINAILA, a town and territory of Africa, on the river Rio Grande, near its mouth. N. lat. 11° 15'. W. long. 14° 15'.


Gen. Ch. Cal. Perianth of one leaf, tubular, permanent, inferior, its orifice with five pointed spreading teeth. Cor. of one petal, irregular; tube long, narrow; limb of two lips, the upper one larger, roundish, concave, ascending; lower in three deep roundish segments, the middlemost larger, deflexed, emarginate. Stam. Filaments four, inserted into the tube above its base, two of them longer than the roll; anthers each of two separated oblong cells, one of them terminal, fertile; in the longer flamen only, the other like a little fleece in the middle of each filament. Pip. Germin roundish, superior; style thread-shaped, the length of the tube; stigma four-lobed. Peric. Drupa turbinate, auricular, dry, projecting beyond the permanent calyx. Nut angular, of four or five cells. Seeds solitary.

Eff. Ch. Calyx with five sharp spreading teeth Cortex ringlet, two-dipped; the lower lip three lobed. Nut coated, furrowed, involuted with the calyx. Seeds solitary. Another of two distinct lobes.

Obs. We think this genus ought to be placed in Diny- naim, along with Verbena, to which it is nearly skin, though only the longer flamen appear to be perfect; but this may happen, and cannot be determined without repeated examinations of wild specimens.


Native of several parts of the West Indies, where Howlett and Swartz have gathered and examined it. This is an annual and rather humble herbaceous plant, with a branched stem, ovate deeply serrated leaves, and long loose spikes of small whitish flowers.


Native of Guiana and Cayenne. Much like the former, but with downy leaves, and unarmed fruit, and the middle segment of the lower lip of the corolla, according to Swartz, is emarginate in this, entire in the preceding. Neither of them have much beauty, nor any other qualities to recommend them for cultivation with us in the lowe, though perhaps they might be planted out for the summer, if desirable, like other tender annuals.

GHINNA, or GHENNE, in Geography, a town of Egypt, on the E. side of the Nile, opposite to Kiffa, or Koptos, on the other side, and distant from Coëssor, or Kolire, on the Red Sea, about 90 geographical miles. N. lat. 26° 11'. E. long. 32° 45'.

GHINUE, a town of Asiatic Turkey, in Natolia; 24 miles N.W. of Sinoe.

GHIO. See Kemillik.

GHIO, a town of Africa, belonging to the Foulahs, on the Senegal; 12 miles S.W. of Gunnel.

GHIR. See Gir.

GHJRGIN. See Gunugin.

GHIRLANDATIO, DOMENICO, in Biography, a painter, of whom Vafari speaks as being of the first rank in his time. His real name was Corradelli. He at first was employed by his father, in his own profession of goldsmith, at Florence, who obtained the name of Ghirlandaio, by having been the first to make little metallic ornaments (Ghirlandi) for children to wear. Domenico continued to paint, after he had adopted painting as his profession, for the churches and palaces in Florence, both in fresco and in oil. He, like other artists of the time, introduced into his pictures the portraits of his friends, but gave them more character pertaining to the subject, than had hitherto been done; and he was the first who left off gilding in pictures, and attempted to imitate its effects by colours. He was called to Rome by Sixtus IV. to adorn other palaces employed in painting his chapel. His works there were afterwards spoiled to make room for those of M. Angelo. He was highly honoured, and employed nobly; but his greatest glory is, having had the great hero of the art, M. Angelo, for a pupil. He died in 1493, at the age of 44. His brothers, David and Benedetto, imitated many of his works, and educated his son Ridolfo to the art, who afterwards made great progress, and obtained esteem from Raphael himself, who invited him, but not successfully, to work in the Vatican. In Ridolfo's pictures, Mr. Fuseli says, there is something analogous to the genius of Raphael; although, in the vivacity of the face, the choice of the colours, the tender idealizing of the features, the soft adoration, and fondness expressed, with inferior powers. He died in 1566, aged 75.

GHIRNAH, in Geography, a river of Hindoostan, which runs into the Taptar; 36 miles S.B. of Burhanpore.

GHISCIOLA, a town of Italy, in the department of the Upper Po; 15 miles S.E. of Cremona.

GHISETELLES, a town of France, in the department of the Lys, and chief place of a canton, in the district of Bruges; 11 miles S.W. of Bruges. The place contains 2,500, and the canton 11,424 inhabitants, on a territory of 18,211 square kilometres, in 18 communes.

GHIWIRA, a town of Italy, in the department of the Olloa; 30 miles N.W. of Milan.

GHIZNI, or GAZNA, an ancient empire of Hindooftan, founded by Abilfagi, governor of Khorasan, A.D. 956, who revolted from the king of Bucharâ. Ghizni confided chiefly the tract which comprised the kingdom of Bactria, after the division of Alexander's empire; that is, the countries lying between Parthia and the Indus, and south of the Oxus. The Ghizni empire, subjected to the same causes of decay as his predecessors, was, in 1358, forcibly divided; the western, and largest part, and which still retained the ancient name of the empire, being seized on by the family of the Ghaurides, (to
demominated from Gaur, or Ghor, a province and city lying beyond the Indian Caucuas), while the provinces contiguous to both shores of the Indus, remained to Chuforo, or Ciftro, who fixed his residence at Lahore; and even his proclivities were, in 1184, driven out of their kingdom by the Gaurides. The death of the emperor Mahomed Gori, in 1205, occasioned a new division of the Ghizni empire; the Persian part remaining to Elkoze, and the Indian part to Cutilub, who founded the Patan, or Afghan dynasty, in Hindooстан.

In 1221 Genzic Cawn, among his extensive conquests, accomplished that of the empire of Ghizni; putting an end to the dynasty of Charsam, which then occupied that throne, and driving before him the unfortunate Gahib, son of the reigning emperor, who forced the Indus to avoid his fury.

The ancient empire of Ghizni is nearly comprehended by the kingdom, known at present by that of Candahar. See Candahar.

Ghizni, or Gaizna, a city of Candahar, once the reputed capital of the Ghizni empire, and placed among the western sources of the Indus, and not far from the Indian Caucuas. The position of Ghizni is erroneous; fixed by M. D'Anville in the N.W. extreme of Cabul; whereas it appears to be almost in the very heart of that province. It is termed the "Second Medina," on account of the great number of illustrious persons whose remains have been interred there. Wonderful stories are related concerning its extent and population in ancient times; nevertheless, Lasser expresses his surprise at its having ever been pitched on for the seat of any empire. Ghizni is distant about 56 geographical miles S. by W. from Cabul, about 1676 miles from Candahar, and about 88 miles from Esmahan. N. lat. 33° 45'; E. long. 86° 28'.

Ghodan. See Gorax.

Ghoga, a town of Holland, in Overijssel, on the Rijcker; 10 miles N.N. E. of Borkeloe.

Ghor. See Givan.

Ghora, a town of Arabia, in the country of Yemen; 15 miles E. of Labbo.

Ghoup, a mountain of Southern Africa. This, and also Nieuweld, are a continuation of the Roggeveld mountain, and join the divisions bearing the same name in the district of Graaf Reinet. They have lately been defunct, on account of the number of Booshefman Hotentots, who dwell close behind them.

Ghurband, a town, and district of Cabul; 42 miles N.W. of Cabul. N. lat. 33° 55'; E. long. 87° 5'.

Ghouri, a town of the kingdom of Balk. N. lat. 35° 40'; E. long. 66° 56'.

Ghule el Alijan, a town of Arabia Felix; 10 miles N.E. of Chamir.

Ghulpaigan, a town of Peria, in the province of Iraq, taken by the Afghans in 1723; 100 miles N.N.W. of Ispahan. N. lat. 33° 45'; E. long. 50° 40'.

Ghumischkana, a town of Afghan Turkey, in the government of Trebizond; 50 miles S.S.W. of Trebizond.

Giumufede, a sea-port of Arabia, on the Red Sea, belonging to the sherry of Mecca. All vessels which carry coffee to Jidda are compelled to anchor here, and pay a duty; 145 miles S. of Mecca. N. lat. 29° 7'.

Ghuni, one of the smaller Cape Verde islands, being little more than a rock.

Ghirman, a town of Peria, in Segelatan; 50 miles N.E. of Ferahe.

Ghayaspour, a town of Hindooстан, in Bahar; 20 miles W.S.W. of Chuprab.

Gia, an Italian adverb, used in Myce for already, formerly, e ci sono; as "Gia maestro di cappella del Duce di Milano," formerly maestro di cappella, or composer, to the cathedral of Milan.

Giaabur, in Geography, a fortress of Asian Turkey, in the province of Diarbekir; 120 miles S.S.W. of Diarbekir.

Giacomelli, Gaemiano, in Biography, of Parma, composed for the theatres of Venice, between the years 1754 and 1756, seven or eight different dramas, written chiefly by Apollolo Zeno and Maffia. He was the scholar of Capigli; but adopted a more high and flighty style, with which the Venetians were much captivated, before they heard the more graceful and expressive airs of Vaci and Hail.

Giacomo, Sr. in Geography, a town of Italy; three miles S. of Verona.—Also, a town of the Valdaine; two miles N.W. of Chivazan.

Giacomo, Sr., valley of, a valley of Switzerland, which is part of the county of Chivazan. It is narrow, and watered by the torrent Lira; contains about 10 parishes, is under the jurisdiction of the commissary, and possesses several important privileges that preserve the inhabitants from the oppression which their neighbours endure. All cause are tried in the valley. The criminal matters are those of Chivazan, with this difference, that instead of the silence, the valley chews four persons, who are always present at the examination; and without whose concurrence, torture cannot be inflicted, nor sentence passed. The valley has its own code of jurisprudence, and courts independent of the commissary, from the decision of which an appeal lies to the diet.

The lower part of the valley produces vines and corn; the upper, rye, barley, and pulate, mixed with large groves of fir and pine.

Giacomo Arkadel, in Biography, a Netherlander, and a disciple of Juquin, enumerated by Adami among the fingers and composers of the pontifical chapel in the 18th century. He was maecistro di cappella some time at the cardinal of Lorrain, and had acquired great fame by his madrigals, of which he published at Venice, between the years 1530 and 1575, five books. In one of which is the celebrated madrigal, "Il bianco e dolce Cigno cantando muore," which was in high favour all over Europe.

Giaiden, in Geography, a town of Arabia, 60 miles W. S.W. of Mecca.

Giadila, a town of Arabia, in the province of Nedsjed, 60 miles S.W. of Kariatin.

Giadri, a town of Albania, on the Drino; eight miles N. of Alepfo.

Gigats of Africa. See Jages.

Giachi, or Jachagi, a cycle of twelve years, in use among the Turks and Cathays.

Each year of the giachi bears the name of some animal; the first that of a mouse; the second, that of a bull; the third, of a lynx or leopard; the fourth, of a hare; the fifth, of a crocodile; the sixth, of a serpent; the seventh, of a horse; the eighth, of a sheep; the ninth, of a monkey; the tenth, of a hen; the eleventh, of a dog; and the twelfth, of a hog. They also divide the day into twelve parts, which they call giachs, and distinguish them by the name of the same animals. Each giach contains two of our hours, and is divided into eight lbs, as many as there are quarters of hours in our day.

Gialakowa, in Geography, a town of Euroca, or Turkey, in Romania; 60 miles N.E. of Filippopoli.

Giallollino, in Natural History. See Nafas Yellow.

Giamani,
GIANMANI, in Geography, a town of Persia, in the province of Chufillian; 15 miles S.S.W. of Suzer.

GIAMBASSI, a town of Asiatic Turkey, in Natolia; 20 miles S.S.E. of Smyrna.

GIANAL, a town of Persia, in the province of Kerman; 50 miles E. of Sinojan.

GIACAZZO, St. a town of Naples, in the province of Otranto; 12 miles S.W. of Brindisi.

GIANNONE, Petrus, in Biography, was born at or near Naples about the year 1630. He was educated for, and practised in, the law, but was much more distinguished as an historian. In 1723, he wrote a "History of Naples," in four volumes 4to. The style is pure, but the freedom with which he discussed several topics relating to the origin of the papal power gave so much offence to the court of Rome, that he was obliged to exile himself from his native country. He found an asylum with the king of Sardinia, who did not, however, dare to afford him his protector, but chose rather to represent his situation as that of a prisoner. Giannone died in Piedmont in 1748. Extracts from his history were afterwards printed in Holland under the title of "Anecdotes Ecclesiastiques." His pathomous works were given to the world in a quarto volume, containing, among other miscellaneous matter, his "Professor of Faith," and a justification of his history.

GIANOTTO, a performer on the double-bass in the opera at Paris, from the year 1730 to 1757, who published, in 1750, a treatise built on the principles of Ramo, entitled "Guide du Compositeur," the Composer's Guide: a work much admired by the followers of Rameau. The author of this treatise having been long in the practice of explaining the system of the fundamental base to his scholars, has drawn up his own work in a clear and intelligible manner.

GIANNUTI, in Geography. a small island in the Mediterranean sea, near the coast of Italy. N. lat. 42° 24'. E. long. 11° 30'.

GIANT, 7ft. 4in., a man of extraordinary, enormous stature and bulk.

The reality of giants, and of nations of giants, is much controverted among the learned. Travellers, historians, and relations, both sacred and profane, furnish various instances of them; a great part of which naturalists and antiquaries assert.

There are among the ancients who speak of giants, as historians, and all men there were such beings, are Caesar, de Bello Gallico, Lib. i. Tacitus, de Morib. German. and Amil. Lib. ii. Florus, Lib. ii. pap. 2. St. Augustin, de Civit. Del. Lib. xx cap. 9. and Saxo-Grammaticus, at the end of his history among the moderns, Hannon, Magnus, Miscellan. de Gigantibus, Chauquesius, de Gigantibus; Kircher, Mund. Sotterr. Lib. viii. sect. 2. and many others, that Stobæus, in his notes on Saxo-Grammaticus, affirms, nothing can be more extravagant than to deny or allegorize the such stories we have concerning them.

Dr. du Chaton observes, that though we read of giants before the Flood, Gen. vi. 4, and more plainly after it, Numb. xiii. 33, yet it is highly probable the size of man has always been the same from the creation; for as to the Nephilim, Gen. vi. the ancients say about them, some taking them for men of impurity, others for rapine, tyranny; as to those, Numb. xiii. who were evidently spoken of as men of a gigantic size, it is probable the tears of the fish might add to their bulk.

But this as it will, it is manifest, that in both these places giants are spoken of as raptists and wonderers of the age, out of the common nature; and such inances we have had in all ages. But it is not at all improbable, that the first men were of a strength and stature superior to those of mankind at present, since they lived a much longer time; long life being commonly the effect of a strong constitution. There are many fabulous relations; such as we take to be that of Thleuto-bocchus, who is said to have been dug up anno 1613, and to have been higher than the trophies, and twenty-six feet in height; and no better we suppose the giants to have been, of whom Ol. Magnus gives an account in his fifth book; such as Herthen and Starchater, among the men; and among the women, "reperta est (faith he) quaela—in capite vulpes, mortua, induta chlamyde purpurea longitudinis cubitorum 50, latitudinis inter humeros quantura." Ol. Mag. Hist. lib. v. cap. 2.

But, as in the more credible relations of Goliath, whose height was six cubits and a span, (1 Sam. xvii. 45.) which, according to bishop Cumberland, is somewhat above eleven feet English, of Og, king of Bashan, (Deut. iii. 11.) whose bed was nine cubits long and four wide, of Maximinus the emperor (who was nine feet high), and others in the reign of Augustus and other Roman emperors, of about the same height; to which might be added the dimensions of a skeleton, dug up in the place of a Roman camp, near St. Alban's, by an urn inscribed Marcus Antoninus, of which an account is given by Mr. Chefefield, who judged, by the dimensions of the bones, that the person was eight feet high, Phil. Trans. N. 333; these antique examples and relations, we say, may be matched, may outdone, with modern ones; of which we have divers in J. Ludolph. Comment. in Hist. Æthiop. lib. ii. cap. 2. sect. 22. Magnus, Conringius, D. Hakewel, and others; the last mentioned writer speaks from Nannos, of porters and archers belonging to the emperor of China, fifteen feet high, and of others from Purchas, of ten and twelve feet high, and more. See that learned author's Apol. p. 288.

The existence of a race of men above the common stature, on the coast of Patagonia in South America, has been the subject of dispute for the last two centuries. In one century almost all navigators, of every country, affirmed that there were such persons: and in the next the fact is denied by the greater number, and their predecease are treated as timid or boasting fabulists. The Yrca Garcellato de Vega, in his history of Peru, relates, that according to a tradition universally received, a number of vessels or junkes came to St. Helena with a company of giants on board, of a stature so enormous, that the natives of the country were not higher than their knees; that their eyes were as broad as the bottom of a plate, and their limbs proportionately large. But these are fables, similar to those relative to the same subject in other parts of the world. See GIANTS' legs.

Turner, the naturalist, reports that he had seen, near the river Plata, on the coast of Brazil, a race of giants, who went stark naked, one of whom was twelve feet high; but he acknowledges that he saw no others so tall. The ocular witnesses on the affirmative side of the question are, Magellan, Loaifa, Sarmento, and Nodal, among the Spaniards; Cavendish, Hawkins, and Knivet, among the English; Schull, De Noort, Le Mair, and Spilberg, among the Dutch; and among the French, those who went in the expedition from Mareilles and St. Maloes, in the year 1724.

Knivet affirms that he measured several dead bodies, which he found buried at Port Defire, which were from fourteen to sixteen spans high; and that he had frequently seen at Brazil one of the Patagonians, who, though a youth, measured no less than thirteen spans; and that the English prisoners at Brazil affirmed him, that they had seen many men of the same gigantic stature upon the coasts of the island; this account is also confirmed by Schell de Wel, and Oliver de Noort. Arie Clia,
GIANT.

Clair, a commissary on board Le Maire's fleet, declares that he found, in the fuculches on the coast of Patagonia, the bones of men who were between ten and eleven feet high. Nodal and Sir Richard Hawkins merely relate, that these fossils were a head taller than the inhabitants of Europe, and of such a stature, that the people on board their vessels called them giants.

Those who bear testimony to the contrary, are Winter, the Dutch admiral Herrmitz, Froger in De Gennes's Narrative, and Sir John Narborough. Sir Francis Drake also is silent with respect to the stature of the inhabitants of Patagonia; but Winter positively affirms, that the accounts of their being giants are falsehoods invented by the Spaniards. Narborough measured the skulls and the print of the feet of the fossils on the coast of the Strait of Magellan, which, he says, were of the common size; and he had often seen companies of them at Port St. Julian, who were neither taller nor bigger than other men. However, it may be observed in general, that the greater part of those who hold the affirmative in this question, speak of people that inhabited the desert coasts of Patagonia to the east and west; and that, on the contrary, those who hold the negative, speak of those who inhabit the Strait upon the sides of the utmost point of America to the north and south. Frezier relates, not from his own knowledge, but from the testimony of eye-witnesses, that there was, at a considerable distance within the country from the coast of Chili, an Indian nation, called by their neighbours Caucouhnes, who sometimes came down to the Spanish settlements, that were more than nine feet high, and were the same race with the Patagonians who live on the easter coast. It appears from various relations, that the inhabitants of the two borders of the Strait are of the common stature, and that the race, distinguished by the name of Patagonians, make their constant residence upon the desert coasts, scarcely accessible to any but themselves; and when European ships frequented the Strait, they removed and settled in the interior part of the country; however, the current testimony of late navigators, particularly commodore Byron, captain Wallis, and captain Carteret, will put an end to the doubts that have been hitherto entertained of the existence of such persons. Commodore Byron, who visited the coast of Patagonia in the year 1764, speaks of the inhabitants as of a gigantic stature; but he did not measure any of them, and only concluded, by the proportion of their stature to his own and that of his companions, that they could not be less than six and a half, or seven feet in height, and proportionably strong and bulky.

Captain Wallis had an interview with these people in 1766, and found, by measuring them, that the stature of the greater part of them was from five feet ten inches to six feet, though there were some who were five feet five and five feet six inches, and one who was five feet seven inches. Captain Carteret, who accompanied captain Wallis on this occasion, confirms the above account in his letter to Dr. Maty. See Phil. Trans. vol. iv. art. 2. p. 29, &c. See Hawkesworth's Voyage, vol. ii. Introd. and p. 28. 154.

GIANTS, Rebel, in Ancient Mythology, were the sons of Terra, or the Earth, by Cacus, who made war against Jupiter and the celestial deities, to avenge the defeat of the Titans. These giants are represented as of an enormous height and size, having a wild and dreadful aspect, and killed by strength proportioned to their bulk; each of them had a hundred hands, and from insted of legs. Being determined to dethrone Jupiter, they reared Mount Ossa upon Pelion, and Olympus upon Ossa, and from thence attacked the gods with huge rocks, some of which fell into the sea and became islands, and others fell on the earth and formed mountains. Jupiter summoned a council of the gods, and being informed that it was necessary to obtain the assistance of some mortal, with the advice of Pallas he called up Hercules, and with the aid of this hero, exterminated the giants Enceladus, Polhub, Akyon, Phorphyrio, the two sons of Atyus, Ephialthus, Others, Eurystus, Clythus, Tythus, Pallas, Hippolitus, Agrimus, Thoim, and Typhon, the last of whom it was more difficult to vanquish than all the others. Jupiter having thus gained a complete victory, called the rebels down to Tartarus, where they were to receive the full punishment of their enormous crimes: according to the account of some of the poets, he buried them alive under Mount Etna and different islands.

For the explanation of this fable, some have supposed that Jupiter (for whose history, see JUPITER) destroyed the robbers that infested Thessaly, and that there are the pretended giants; for we have already observed (in the preceding article) that the appellation "Nephilim," occurring in Scripture, and translated giants, signifies people addicted to all kinds of licentiousness and violence, or robbers and ruffians. Jupiter, when he left Crete to visit the other parts of Greece, usually resided on Mount Olympus, where he had probably built a strong citadel. This Mount Olympus, highly elevated, was afterwards taken for heaven itself, and the most ancient poets, especially Homer, to describe it. The banditti now mentioned, determined to make an attack on that prince, besiege him in his citadel, which afterwards gave rise to the fiction of their having attempted to scale heaven, and of their having made an assault upon it. It is added, that with this view they pried Ossa upon Pelion, importing, as it is conjectured, that they had fortified these two mountains, which are also in Thessaly, and at no great distance from Olympus, whither they retired after their excursions, and kept Jupiter's garrisons in awe. For other particulars, see Baner's Mythology, vol. iii. See also TITANS.

GIANTS' BONES, a name too hastily given by the vulgar to certain bones and parts of skeletons, of an enormous size, found in England and other places. Of all the numbers of thefe, which have been publicly thrown about as wonders in nature, not one but has proved, on examination, a bone of an elephant, or else of a whale, or of some other terrestrial or aquatic animal not perhaps extinct; the first, however, is usually the case, as the bones of elephants are much more frequently found buried in the earth than those of the whale.

Sir Hans Sloane mentions a vertebra of the loin of a whale sent him from Oxfordshire, where it was dug up under ground, and afterwards used as a stool to sit upon, and vulgarly supposed part of a human back-bone. Now, if the whole size of the body had been calculated from this piece, the account would have presented such a size as would have far exceeded all the fabulous stories of giants' skeletons extant in the world.

Many skeletons of this kind have been found which have been called the skeletons of giants: such are those of Pholadnatus, which are said to be the bones of men of twelve, twenty, and even thirty cubits high; that found in a mountain of Crete, and mentioned by Plato and Pliny, forty-six cubits high; another of sixty cubits, found near Tanger in Moorsia, mentioned by Plutarch and Strabo, and supposed to be the skeleton of Anteus; the skeleton of Pallas, the son of Evander, found in Rome, and said to be taller than the walls of that city; another, found in England in 1171, fifty feet long. St. Aulin allées, in proof of the existence of giants. Before the flood, a gringer tooth, which he saw on the shores of Utica, was in reality that of
GIANT.

The regular figure of the flone, composing this caufeway, is not more wonderful than its quantity. The whole country for many miles being full of it, and a vall mafs running far into the fea; for, before what vulgarly goes by the name of the Giants Caufeway, which is itself of vall ex-tent, there are great numbers of the fame pillars at distances in other places.

There are two other smaller and imperfect caufeways to the left hand of the great one, and farther in the fea, a great number of rocks flew themselves at low water, which appear plainly all to confift of the fame fort of column. In going up the hill from the caufeway there are found, in different places, a vall number of the fame columns; but these do not stand erect, but are laid finking upwards in different angles and directions. Beyond this hill, eastward, also, at feveral distances, there stand a great number of the fame pillars, placed ftraight and erect, and in clusters of different fizes. These are feen scattered, as it were, over the vell parts of the hills.

One parcel of them is much admired, and called by the country people the looms of the organs. It flands in an elegant form, and faces the bottom of the hill. The columns, of which this clufter confifts, are about fifty in number, and they are fo nicely put together, that the tablet fland in the middle, and the shorter gradually on each fide of it to the end, fo that they look like the pipes of a church organ viewed from the front. The tablet one of all these, which flands exactly in the centre, is forty feet high, and confifs of forty-four diftinct joints.

What is emphatically called the Giants Caufeway is, in fact, a small portion of that vall basaltic area, of which the promontories of Bengore and Fairhead confift, and which extends over a great part of the neighbouring country. These two great promontories, which have been examined by many, and lately by Dr. Richardson, fland at the distance of eight miles from each other, and are the leading features of the whole caft of Antrim. The former of them, situated about seven miles Wefl of Ballycastle, represents it elf at a distance, and in profile, as an extensive headland, running out from the caft a coniferable length into the fea; but, frivolly speaking, it is made up of a number of leffer capes and bays, the whole of which forms what the fenmen denominate the headland of Bengore. These capes are compofed of a variety of different ranges of pillars and a great number of strata, which, from the abruptnefs of the caft, are very confpicious, and form an unrivalled pape of natural architecture, in which all the neat regularity and elegance of art is united to the wild magnificence of nature. The promontory of Fairhead raifes its lofty fummit more than 500 feet above the fea, forming the eafhern terminal of Ballycastle bay. It prfents to view a vall compact mass of rude columnar flones, the forms of which are extremely grofs, many of them being near 150 feet in length, and of a vall texture. The base of these gigante columns fixes a wild wall of natural ruins, of an enormous fize, which, in the course of fuccedance ages, have been tumbled down from their foundation by flones, or foine more powerful operations of nature. The maffe bodies have sometimes withstood the flock of their fall, and often lie in groups and clumps of pillars, refeemblying many of the varieties of artificial ruins, and forming a very novel and striking landscape. Befides these two promontories, there are feveral other parts of the county of Antrim which exhibit a fimilar columnar basaltic structure. Thus the mountain of Dunmull, between Coleraine and the river Bush, abounds in fuch basalt, particularly at the craigs of Illamore, where two different ranges of columns may be discovered; they may be seen

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also at Dunluse-hill, near the castle of Dunluse; in the bed of the river Buth, near the bridge of Buth-mills; on the summit of the mountain of Croogimon; in many parts of the high land over Ballintoy; in the island of Raghery, opposite Ballycastle, and various other places, through an extent of coast about fifteen miles in length and two in breadth. Beyond this tract, which abounds in perfect pillars, an attentive observer will be able to trace the same materials and stratification in very distant parts of the country, as far as the northern shore of Loughnag, and the mountains of the county of Derry; in many places of which imperfect columnar forms may be observed; so that the great cause which generated this species of stone has been exercised through a space of more than forty miles in length and twenty in breadth; that is, through above eight hundred square miles.

Of the different varieties observable in the columns that compose the Giants Caufeway and those of the other parts of the coast, the following comparative view has been given by Mr. Hamilton. 1. With respect to form and magnitude: the pillars of the caufeway are comparatively small, not very much exceeding one foot in breadth and thirty in length; sharply defined, neat in their articulation, with convex or concave terminations to each joint. In many of the caps and hills they are of larger size, more imperfect and irregular in their figure and articulations, having often flat terminations to their joints. At Fairhead they are of a gigantic magnitude, sometimes exceeding five feet in breadth and a hundred in length; often apparently delitute of joints altogether. 2. With respect to situation: the pillars of the Giants Caufeway stand on the level of the beach, from whence they may be traced, through all degrees of elevation, to the summit of the highest grounds in the neigbourhood, as at the old fort of Drumill, and on the top of Croogimon, fix hundred feet at least above the level of the sea. 3. With respect to disposition and arrangement: at the caufeway, and in most other places, they stand perpendicular to the horizon; in some of the caps, and particularly near Ulbent harbour in the isle of Raghery, they lie in an oblique position; at Doon-point, in the fair island, and along the Ballintoy shore, they form a variety of regular curves. 4. With regard to colour and grain: the Giants Caufeway basalt is blackish, close, and uniform; its varieties of colour are blue, reddish, grey; and of grain, all that can be effuped from extreme fineness to the coarse granulated appearance of a stone, which resembles imperfect granite abounding in crystals of horn, chiefly black, though sometimes of various colours. 5. With respect to texture: though the Giants Caufeway basalt be in general compact and homogeneous, yet the upper joint of each pillar, where it can with certainty be ascertained, is always rudely formed and cellular. The grofs pillars also, in the caps and mountains frequently abound in these air-holes through all their parts, which sometimes contain fine clay and other apparently foreign bodies: and the irregular basalt beginning where the pillars cease, or lying over them, is, in general, extremely honey-combed, containing in its cells crystals of zeolite, little morrels of fine brown clay, sometimes very pure flaxite, and in a few instances bits of granite.

The inland pillars, upon the whole, differ from those which run into the sea, and are called the caufeway, only in the following particulars; some of the inland pillars are much larger than those of the caufeway, being two feet and a half in diameter, and among these there are only found such as have three, four, five, and six sides, none of them having yet been found to have seven or eight sides, as many of those of the caufeway itself have. And, finally, these inland pillars, though composed of as many joints as those of the caufeway, yet have not that curious articulation of the ball and socket, but are only joined by the laying one smooth surface on another; so that a joint of a single column may be dipped off from the red, by a considerable force prifling against it. There is something like this observable also in some of the columns of the caufeway itself; for among the numbers which are jointed by the ball and socket, there are some which do not adhere by being applied surface to surface. This is found only in a few of the columns, however, and they always stand within the chisels, and are composed of less than seven sides. In those also the joint is not made by the application of two horizontal planes, but by such as flant, so that it looks very like the breaking of an entrochus or sileria.

The joints, as we see the pillars above the surface, are usually as many in number as the pillar is feet high; but they are not regularly each of a foot long, for they are shortened at the upper part of the columns, and run gradually longer and longer as they approach the bottom. This is observed both in the inland columns, and in those of the caufeway; but though the length of the joints differs, their convexities and hollows are much the same in all parts of the column.

There are other basaltic columns, similar to those above described, in our own island; particularly at Staffa, one of the western islands of Scotland; in the mountain of Caderidris, near Dolgelly, in Merionethshire; where they probably form a group as in other places. Mr. Strange has given an account of two groups of prismatic basaltic columns, which he discovered in the Venetian slate in Italy; one in Monte Roffo, about seven miles near south from Padua, and the other in Monte del Diavolo, near San Giovanni lllarione, about ten miles north-west of Vicenza. The form of the latter is nearly circular, resembling that of the Giants' Caufeway; that of the former approaching more to an oblong or oval figure; the columns of San Giovanni are much about the same figure, just about about a foot in diameter; those of Monte Roffo are very unequal; the one being a foot, while others scarcely exceed three inches in breadth. This is the case of both the Venetian groups manifest all the varieties of prismatic forms observable in the Giants' Caufeway, and other such groups; but they are commonly of five, six, or seven sides, and the hexagonal form seems mostly to prevail. The texture of the former is solid and uniform; the surface smooth, and the internal parts of a dark iron-grey colour; those of Monte Roffo have a rough and knotty surface; and, when broken, manifest a varied coloured, and unequal texture of parts; resembling an inferior sort of granite, of which the mountain is formed, and which serves as a base for this range of columns. Other groups of articulated basaltic columns have also been observed in the province of Velay and Auvergne in France; particularly by M. De Varennes, at Bland near Langec, and by M. Defmarets, near le Mont d'Or; and M. Sage mentions another near St. Alcon, in the same province. Kircher has long ago described a group of the same columns near Viterbo in Italy. Mandrus Subterraneus, lib. vi. cap. 9. &c. And Mr. Strange mentions another at Castel Nuovo, in the Euganean hills, about four miles south-west of that of Monte Roffo.

For the various controversies with regard to the origin of these basaltic columns, and of the flint-trap-rocks in general, see Trap.

GIANTS' HEAD, in Geography, a cape on the east coast of
of the island of St. Christopher, a little to the east of Ragged Point.

GIAR, a town of Perú, in the province of Farriñan; 70 miles E. of Schinas.

GIAR. — See DjEBAR.

GIARABUR, in Botany, a name given by Avicenna, Serafin, and the rest of the Arabic writers, to the potamogeton of those times. This is translated by some the water-lily, but that is founded on an error: it is certain that the plant thus called by the Arabs was very different from the potamogeton of our times. Avicenna tells us, it had flowers resembling those of the water-lily; and it seems either to have been the fagitta aquatics or water arrow-head, or else the butomus, or some of the smaller species of nymphæa.

GIARAF. CAPE, in Geography, a cape on the coast of Tripoli. N. lat. 34° E. long. 11°.

GIARDINI, Felice, in Biography, in many respects the greatest performer on the violin during the last century. He was a native of Piedmont; and when a boy was a choicerl in the Duomo at Milan, under Paladinì, of whom he learned singing, the harpsichord, and composition; but having previously manifested a disposition and partiality for the violin, his father called him to Turin, in order to receive instructions on that subject from the famous Sonus. But, though he possessed the violin, upon which he soon became the greatest performer in Europe, seems a lucky circumstance, yet he had talents which would have made him a superior harpsichord player, had he continued to practice that instrument; but he used to say, that he was perfectly cured of that vanity at Paris, by the performance of Madame de S. Maur, a scholar of Rameau, who played in such a manner, as not only made him ashamed of his own performance, but determined him never to touch the instrument again in serious practice. He went to Rome early in his life, and afterwards to Naples, where, having obtained a place among the ripienos in the operatic orchestra, he used to flourish and change passages much more frequently than he ought to have done. "However," says Giardini, of whom we had this account, "I acquired great reputation among the ignorant for my impertinence; yet one night, during the opera, Jonelli, who had composèd it, came into the orchestra, and taking himself close to me, I determined to give the maestro di cappella a touch of my taste and execution; and in the symphony of the next song, which was in a moderate style, I gave loose to my fingers and fancy; for which I was rewarded by the composer with — violent flap in the face; which," adds Giardini, "was the best lesson I ever received from a great master in my life." Jonelli, after this, was however very kind, in a different way, to this young and wonderful musician.

Giardini came to England in the spring of 1750. His first public performance in London, at which we were present, was a concert for old Cuzzoni, who sang in it with a thin cracked voice, which almost frightened out of the little theatre the easy-market the fans of those who had heard heard his; the great theatre in the fame faces, with exacty. But when Giardini played a solo and concertos, though there was very little company, the applauses was so loud, long, and furious, as nothing but that bellowed on Garrick had ever equaled. We had not him the night before at a private concert, with Giardini and Frélia at the house of Napoleon Trump, who was himself one of the best dilettante performers on the violin. At that time, and we were all equally misguided with the various powers of Giardini, at no early period of his life. When, besides solo of his own composition of the most brilliant kind, he played several of Tartini's, in manuscript, at sight, and at five or six feet distance from the notes, as well as if he had never practiced any thing since. His tone, bow, execution, graceful carriage of himself and his instrument, and performing a M.S. piece of a young composer in the room, he declared that Giardini had so improved it as to make it better than he intended, or had imagined it to be in the warm moments of conception; and lally playing variations extempore, during half an hour, upon a new but extraordinary kind of birth-day minuet, which accidentally lay on the harpsichord—all this threw into the utmost astonishment the whole company, who had never been accustomed to hear better performers than Featling, Brown, and Collet! Of his academy, scholars, manner of leading at the opera and oratorio, performance in private concerts, compositions vocal and instrumental, we shall say nothing here, left our praise should be too much for others, and too little for our selves.

He soon got possession of all the posts of honour in this country. He was engaged and cared for at most of the private concerts of the principal nobility, gentry, and foreign ministers; at the Castle and King's Arms concert in the city, and in 1756, at the opera band; in which he introduced a new discipline, and a new stye of playing, much superior in itself, and more congenial with the poetry and music of Italy, than the hasty manner of his predecessor Featling; who, except one or two seasons, when Veracini was at the head of the orchestra, had led the opera band from the time that Caffarucci was diffmiffed, till the arrival of Minigotti. In 1756, on the failure and flight of the Imperfario or undertaker of the opera, Vancesi, the Minigotti, and Giardini joined their interests, and acquired for a while the sovereignty of the opera kingdom, by which gratification of their ambition, these two great performers were soon brought to the brink of ruin, as others had been before them. But though great applauses was acquired, and appearances were favourable, yet the profits to the managers were so far from foly, that they found themselves involved at the end of the season in such difficulties, that they were glad ti resign their short-lived honours, and flink into a private fortune.

Giardini, while in the opera management, besides arrangiing partie dustresses, set several dramatic and instrumental pieces; but though he had to great effect on his instrument, so much fancy in his cadences and solos, yet he had not sufficient force or variety to supply a whole evening's entertainment at the Lyric theatre. Yet after he had resigned his throne in the orchestra, he frequently threw in a single air or rondeau into the opera of other matters, which was more applauded than all the roll of the drama; of this kind were the favourite airs of "Vo' anamiti," and "Ah non so perche tu mi, &c."

In 1762, on Mattei quitting the management of the opera, in spite of former miscarriages, Giardini and Miinigotti again resumed the reins of opera government. But after struggling two years against the storm, during the decline of Minigotti's favour, and after an inauspicious season, at the end of 1763, Giardini and his partner again abdicated their thrones. From this period, Giardini, always looking over his former Lyric kingdom, without the power of invading it, or bringing about a resurrection, was forced to content himself with teaching bands of rank and fallowing to find and produce of a great annual benefit. He continued here, unrivalled, as a leader, a solo player, and a composer for his instrument, till augmenting the importance of his instrument and our national prosperity for the sake of his country, till the admirable productions and great performers of Germany began.
Regan to form a Teutonic interest and Germanic body here, which, before Giardini’s departure from London, became very formidable rivals to him and his Roman legion.

At the end of 1764, he went to Italy, and refined a considerable time at Naples, with Sir William Hamilton, one of his first scholars on the violin after his arrival in England.

Remaining on the continent till the summer of 1769, Giardini returned to this country, bringing with him a female pupil and her whole family, attempting a burletta opera at the little theatre in the Haymarket, while the great opera-house, which had been burned down, was rebuilding; but his prima donna not being approved, their speculation failed, and he had her and her whole family on his hands. During his absence the public had learned to do without him, and reconciled themselves to his loss; his health, hand and eyes were impaired; he was droptical, his legs were of an enormous size, and little of his former superiority on his instrument remained, but his fine tone. He composed quartets that pleased very much, but in which he never played any other part in public than the tenor. The style of music was changed; he printed many of his old compositions which used to please; but now could gain neither purchasers nor hearers, so that about the year 1795, he went to Petersburg with his burletta troop; which seems to have pleased as little there and at Moceau, as in London, and he is said to have died in this last city in great wretchedness and poverty!

But before we try to account for this melancholy termination of so brilliant a career, let us endeavour to do justice to his professional abilities.

It is the business of every artist to endeavour to arrive at the head of his profession during the age in which he lives, but no one can be expected to aspire to superiority over all mankind, past, present, and to come. Homer, our own Shakespeare, and Milton, have, perhaps, succeeded in that, if ever they formed it, and Dryden and Pope have gained two out of three of these ears. If Giardini has been surpassed by a few in tale, expression, and execution, his tone and graceful manner of playing are still unrivalled, nor does any one of all the admirables and great performers on the violin, surpass all others in truth at once as Giardini did, when at his best, all the violinists in Europe.

That a man with such talents and intellects as art and nature fearlessly ever allowed to the fame individual, who might have realized 40 or 50,000l, should, by extravagance, caprice, and a total want of benevolence and rectitude of heart, die a beggar, unfriended and unpitied, is fearfully credible! It is painful to probe the private character of such a man; yet it should not be concealed. Truth and morality require it to be recorded. The kings of Egypt used to be tried after their decease.

And if young musicians of great talents, who are prone to deivate from propriety of conduct, should chance to read this article, it may serve as a beacon, and remind them of the possibility of surviving favour and talents, however great, and terminating their excellence in misery and mortification.

A respectable professor, who, from Giardini’s first arrival in England, was constantly attached to him, and a fierce admirer of his concerts, his wit, and even the ingenuity of his person and Wit; before his quitting this country in 1784, delineated his character in the following manner, a copy of which came lately to our hands, accidentally.

Sketch of the private character of a great musician.—“There exists a man who would rather gain half a crown by superior subtlety and cunning than a guinea by useful and fair means; who is of so difficult a commerce, that the utmost circun-
and distinguished by its agreeable situation and salubrious air; 15 miles W. of Turin.

GIAUF, A1, a district of Egypt, in the S.E. part of the Delta.

GIAVI, a town of the island of Sardinia; 21 miles E.S.E. of Algeri.

GIAUKIRI, a town of Asiatic Turkey, in Natolia, anciently "Sigeum," chiefly inhabited by Greeks.

GIZA, a town of Italy, in the Veronese; 14 miles N.N.E. of Verona.

GIB, in Agriculture, a sort of flax with a hook at the end, which is sometimes useful in making and repairing hedges, and for various other purposes.

GIB, in Mechanics. See Crane.

Gins, or Tobings, in Mining, are pieces of wood from two to four or more feet long, with a bird's-mouth or notch cut in each end, that are placed as struts between the four upright poles, at the corners of square or rectangular shafts, which are supported with wood, instead of being girded or bricked.

GIBAU, in Geography, a town of Moravia, in the circle of Olmutz; eight miles N.E. of Olmutz.

GIBBAWAYS, an Indian tribe residing in Upper Canada, on the E. side of Detroit river, opposite to fort Gibralter.

GIBBEN, a town of the duchy of Courland; 32 miles N.E. of Pyltn.

GIBBETHON, in Scripture Geography, a city of Dan, allotted to the Levites (Josh. xxi. 23); probably the same as Gabba; 12 miles from Elutheropolis. Here they flewed the tomb of the prophet Habakkuk.

GIBBON, Edward, in Biography, was born at Putney in 1737. His father was a gentleman of fortune, and some years member of parliament. The subject of this article was a very delicate and sickly child, insomuch that his parents had but little hope of rearing him. From nine years of age to twelve, he was under the tuition of Dr. Woodelon at Kingston-upon-Thames. Here he acquired the elements of classical learning, and he mentions his twelfth year as particularly "proportion to the growth of his intellectual nature," because at this period he read a variety of English books of poetry, romance, history and travels.

He then went to Westminster school, but his ill state of health prevented him from making a regular progress in the studies of the place. For several years he was chiefly the object of medical care, till at length, and, as it were, very suddenly, his constitution acquired firmness, and his father immediately sent him, as gentleman-commoner, to Magdalen college, Oxford. He was probably ill prepared to receive the benefits of an university education, and he signified the fourteen months that he spent there as the most idle and unprofitable of his whole life. To a total neglect of religious instruction he has attributed a very remarkable incident which took place at this time. He had from an early age been addicted to disputation on topics of divinity. His leisure from other pursuits induced him to turn his attention to the controversies between the Papists and Protestants. His mind was overflourished by the arguments of the former, and in 1753 he had an interview with a popish priest in London, when he solemnly alleged the errors of Protestantism. He immediately wrote an elaborate letter to his father, in which he avowed the change in his sentiments, and justified the measure which he had taken. With all the zeal of a new convert he has since declared, "I am proud of an honest sacrifice of interest to conscience: I can never blush if my tender mind was engaged in the folly of that seduced the acute and manly understandings of Chillingworth and Bayle." He was sent by his father to Lausanne, and placed with a Calvinist minister, by whose judicious efforts, aided by his own sound reason and mature reflections, his faith in the Romish articles gradually gave way, and on Christmas day 1754, he received the sacrament in the Protestant church. During the time he spent at Lausanne, he laid the foundation of that knowledge in the languages, and in the art of logic, which enabled him to make so conspicuous a figure in the literary world. To the "History of the Decline and Fall of the Roman empire," we have had occasion frequently to recur for an elucidation of facts, we may therefore be allowed to speak somewhat at large of the author of that work. His ruling passion, that of reading, completely developed itself in Switzerland, and he went to the excitements to industry, from a tutor, Belles lettres, and the history of man, and the human mind, were his favourite objects of study; for the mathematics he had no inclination, and what he did not, and perhaps could not pursue, he was ready to condemn, and congratulated himself that he escaped from them "before his mind was hardened by the habit of rigid demonstration, so destructive of the finer feelings of moral evidence." That this view of the effect of mathematical studies was unjust, might be proved from a variety of instances in which the ablest mathematicians have been equally celebrated for their fine taste and excellent judgment in other branches of literature. In the year 1758 he returned from Lausanne to London, where he was kindly received by his father, and he found in a mother-in-law, a new relative, who in time conciliated his good will and confidence. He now began laying the foundation of a copious library, and soon set about preparations for appearing before the public as an author. In 1761, he printed his "Éloge de l'Étude de la Littérature," in one volume 12mo. It was a very respectable juvenile performance, and was highly praised in the foreign journals. At home it obtained but a small share of public notice. While he was composing this work, at least before it was published, he was engaged in the military profession, which was but ill calculated for a person of his turn. The peace, in 1763, set him free from a commission which he had held in the militia, and he immediately paid a visit to Paris, and having spent some months in that capital, he went to Lausanne, where he published a year in cultivating society, and in collecting materials for a profitable journey into Italy. This he undertook in 1765, and it was, as he felt muttering amidst the ruins of the capital, while the friars were singing vespers in the temple of Jupiter, that the idea of writing his great work, "The History of the Decline and Fall of this City," rushed into his mind. He had, previously to this, proceeded some way in another interesting design, and composed, in the French language, the first book of a History of the Swiss liberty; but this, perhaps on account of its style, was condemned by a literary society of foreigners in London, to whom it was read, and he committed it to the flames. In 1767, he alluded in compiling a critical work, entitled "Mémoires Littéraires de la Grande Bretagne," the succees of which was but trifling. In 1770 he published, in his native tongue, a pamphlet, entitled "Critical Observations on the fifth book of the Envid," which was intended as a refutation of Dr. Warburton's hypothesis concerning the meaning of the deceit of Janus; and in the same year, by the death of his father, he succeeded to an estate considerably involved, and from the perplexities of which he fearlessly ever extricated himself. His circumstances were, however, fairly suited to the task he had undertaken as an author: for he thought himself, that had he been either much poorer or much richer, he should never have accomplished it. Leifure and books were necessaries on the
the one hand; on the other, the stimulus of a handborne increase of property. His acquaintance was large, but he compensated the hours devoted to them by early rising and close application. In 1774, he was, through the interest of Mr. Elliot, introduced to a seat in parliament, which he occupied during eight years, and gave, says he, many a silent vote in support of the rights, though not, perhaps, the interest of the mother country. Early in 1776 the first volume of his "History" made its appearance; its success was very great, and far surpassed the most favorable expectations of the authors. "The first impression," says he, "was exhausted in a few days; a second and a third edition were freely adequate to the demand, and the bookseller's property was twice invaded by the pirates of Dublin." It was received with general applause, but the prospect of fame was so keenly relished by Gibbon, as that of the two celebrated historians, Hume and Robertson, who, instead of viewing his rising fame with jealousy, promoted it with liberal commendation. In the midst of his triumph, his two chapters, concerning the growth and progress of Christianity, raised a storm against him, which, as he had not foreseen, he regarded with some alarm. He was attacked on all sides, but as he professed to have written only as a historian, he declined entering the lists as a controversialist. In one infallible fidelity, as an historian, was attacked; here he felt that he was called on for a "Vindication," in which it was admitted that he successfully repelled the principal charges, and returned them on his antagonist. It was fig叶ally, in the two chapters referred to, that the progress of Christianity was peculiarly favored by secondary causes, and of course that its origin was not divine: though this theory had not been destitute of advocates among sincere believers in the truth of the Christian system, yet there is little doubt that Gibbon was an impartial hand, but that his pre inclination was to reason in this part of his work under the mask of a friend. His pretensions were unveiled by many excellent writers, who ranked high in the established church, and by others who were not in the church, but who were equally alive to the spread of sceptical principles, and active in opposing their propagation. After he had refumed his work, he was solicited by ministers to write an answer to the manifesto of the court of France, on its declaration of hostilities. On this occasion he published his "Memoire justificatif;" it was written in French, and much admired for its style and its reasoning, and was delivered, as a state paper, to the courts of Europe. For this service he was rewarded with the appointment of one of the Lords of Trade, by which a handsome addition was made to his income, and little to his engagements. In 1781 the second and third volumes of his History appeared, which supported the reputation which he had already acquired. Upon the dissolution of lord North's ministry, the board of Trade was abolished, as occasioning only an useless expense to the state. The defalcation in Mr. Gibbon's income no longer permitted him to support the same style of living in his own country, and he removed his residence to Lauffane: here, in an elegant retreat, he finished his History, in three other quarto volumes, which were published in 1788. It was with real regret that he dismissed an occupation, which had given to many years of his life that zest which an interesting object of pursuit can alone impart. He came to England to superintend the printing of his work, and then returned to Lauffane, to spend, as he hoped, the remainder of his days; but the storms of the French revolution, which menaced the quiet and happy regions of Switzerland, gradually loosened his attachment to Lauffane, and he began to look towards England for a refuge. He regarded the events that were taking place in France with the utmost abhorrence, and he either was, from habit, or had become so from the occurrences of the times, a decided enemy to every species of public reform. He avowed his affiet to Mr. Burke's creed, which he had vindicated in his "Reflections:" "I admire," says he, "his eloquence, I approve his politics, I adore his chivalry, and I can almost excuse his reverence for church establishments." Mr. Gibbon returned to England in 1793, but after a few months residence his attention was forcibly called to the progress of a disease, which had fulfilled in a small degree for thirty years, and which now terminated his existence, Jan. 16, 1794. He has characterized himself in the following words: "I am endowed with a cheerful temper, a moderate sensibility, and a natural disposition to repulse rather than activity; some mischievous appetites and habits have, perhaps, been corrected by philosophy or time. The love of study supplies each day, each hour, with a perpetual source of independent and rational pleasure." "He was," says his biographer, "easy in society, and fond of it; he was beloved by his friends, and had, in an eminent degree, the manners and habits of a gentleman. Early indulgence and habit had made the conveniences and graces of cultured life essential to his comfort, and he was not one who could have been content with the coquettishness of mental superiority in an humble state. His great work, which will long be a monument to his fame, is a performance of vast and accurate research, and of enlarged and philosophical thinking; it abounds in splendid passages, and its style displays a thorough mastery of the whole compass of the English language." After his death two quarto volumes of his miscellaneous works were published by lord Sheffield, containing, among other things, memoirs of his life and writings, composed by himself; to which the reader is referred for more particulars relating to this celebrated man.

**GIBBONS, ORLANDO,** without exception, the best composer for the church during the reign of king James I. and though not blemish with longevity, yet, during his short life, he contributed amply to the music of the church, which he enriched with numerous compositions, that are still fresh and in constant use among the best productions within its pale.

This excellent musician, a native of Cambridge, was brother of Edward Gibbons, bachelor of Musick, organist of Bristol, gentleman of the Chapel Royal, and master of Mathew Lock; and of Ellis Gibbons, author of two madrigals in "the Triumphs of Oriana," who is filled by Ant. Wood, "the admirable organist of Salisbury." In 1653, at the age of twenty-one, Orlando was appointed organist of the Chapel Royal, in the room of Arthur Cock. In 1622, he was honoured at Oxford with a doctor's degree in music, at the same time as his friend Dr. Heyther, when both were conterminous and favoured with indulgencies in the university in consequence of letters from the learned Camden, who recommended them with friendly zeal to its notice. According to Ant. Wood, the academical exercise in fix or more parts, performed at this time for Heyther's degree, was composed by Orlando Gibbons, "as one or more eminent musicians then living had several times told him." So that grown-gentlemen, as well as boys, through illincliances or ignorance, are sometimes reduced to the humiliating necessity of having recourse to the charity of friends, before they can exhibit an exercise.

A manuscript copy of the exercise performed for Dr. Heyther's degree, is said to have been found, signed with the name of Orlando Gibbons. It is an anthem for eight voices, taken from the forty-seventh psalm; and appears to be the very same composition as the anthem of Orlando Gibbons.
GIB

Gibbons, to the words "O clap your hands together, all ye people!" Printed in Boyce's Cath. Mus. vol. ii. p. 59.

The harmony in Gibbons's service in F, printed by Dr. Boyce, is pure, clear, and grateful; and the melody more accented and flowing than we have found in any chorale music of equal antiquity.

The two parts of one of the Gloria Patris, though they may be the cause of some confusion in the words, discover no restraint or difficulty in the melody, which continues to move with the same freedom, as if no caesur had existence. And though the partibus, on account of the confusion arising from the parts flagging different words at the same time, pronounce the style, in which his full anthems are composed, to be vicious; yet the lovers of fugue, ingenious contrivance, and rich, simple, and pleasing harmony, must regard them as admirable productions, a la Palestrina, a style in which Tallis and Bird acquired so much renown.

Besides his admirable chorale compositions, O. Gibbons was author of melodies in two parts to the hymns and spiritual songs of the church, translated by George Withers, and of several other works which are mentioned elsewhere. See Fantasia and Partehia.

Dr. Tudday, in the dedication of the first volume of his manuscript, "Collection of the most celebrated Services and Anthems used in the Church of England," addressed to Lord Harley, for whom it was made; after a just and warm eulogium on the abilities of Tallis and Bird, says that "none of the later composers could ever make appear so great a faculty in compositions for the church, except that most excellent artist, Orlando Gibbons, organist and servant to king Charles I. whose whole service, with several anthems, are the most perfect pieces of church compositions which have appeared since the time of Tallis and Bird; the air so solemn, the fagges and other embellishments so just and naturally taken, as must warm the heart of any one, who is ended with a soul fitted for divine raptures." To this encomium every candid judge of harmony will readily subscribe; but when the doctor tells us, that the celebrated service in F was composed by Orlando Gibbons in 1635, he furnishes no very favourable proof of his knowledge in chronology; as it is recorded on the monument erected to his memory by his widow, that he died ten years before that period. For in 1645, being commanded, ex officio, to attend the solemnity of the marriage of his royal master, Charles I., with the princess Henrietta of France, at Canterburay, for which occasion he had composed the music, he was seized with the small-pox, and dying on Whitmasday, in the same year, was buried in that cathedral.

GIBBON, Dr. CHRISTOPHER, was the son of Orlando Gibbons, and scholar of his uncle Ellis Gibbons, organist of Bristol. He had been honoured with the notice of Charles I. and was of his chapel. At the restoration, besides being appointed principal organist of the Chapel Royal, private organist to his majesty, and organist of Welfinster Abbey, he obtained his doctor's degree in music at Oxford, in consequence of a letter written by his majesty Charles II. himself, in his behalf, which is inserted by Dr. Wood in his Fasti Oxonienses, vol. ii. Col. 158; who says, that he completed his degree in an act celebrated in St. Mary's church, July 11, 1664.

The compositions of this master, which were not numerous, seem never to have enjoyed a great degree of favour; and though some of them are preferred in the Museum collection, they have long ceased to be performed in our cathedrals. His abilities on the organ, however, must have been considerable, to entitle him to the stations he filled, at a time when the style of playing that instrument was so much more complicated and elaborate than at present. Dr. Blow, who, in singing and composition, was educated by Captain Cook, is said to have been a scholar on the organ of Dr. Christopher Gibbons, who died 1676.

Orlando Gibbons had two brothers, Edward and Ellis, the one organist of Bristol, and the other of Salisbury. Edward was a Cambridge bachelor of music, and incorporated at Oxford, 1592. Before being organist of Bristol, he was priest-vicar, sub-chantier, and master of the choristers in that cathedral. He was sworn a gentleman of the chapel, March 21, 1624, and was the master of Matthew Locke. In the Triumphs of Oriana, there are two madrigals, one in five, and the other in six parts, composed by Ellis Gibbons. Wood styles him the admired organist of Salisbury. Of Edward Gibbons, it is said, that in the time of the refolution he challenged king Charles I. with the sum of one thousand pounds; for which infinace of his loyalty, he was afterwards very severely treated by those in power, who deprived him of a considerable estate, and thrust him and three grand children out of his house, though he was more than four-score years of age.

GIBBOUS, in Surgery. See SIR W. CURTIS OF.

GIBBOUS, is used in reference to the enlightened parts of the moon, where she is moving from full to the first quarter, and from the last quarter to full again; for all that time the dark part appears horned, or falcated, and the light one bunched out, convex, or gibbous.

GIBBOUS, is, gibbosa, in Ichthyology, a name given by Mr. Ray to the fish called by the Dutch kromm Rodrig. It is a smooth fish without scales, its belly is white, its fins and tail black. It grows to a considerable size, sometimes to four feet. It is caught all over the East Indies, near the sea shores, and is very firm, and much esteemed at table. It has its name from the remarkable rising of its back, which is like that of the perch, but much higher. Ray's Ichthyology, Append. p. 4.

GIBBY, in Geography, a cluster of small islands, in the East Indian sea, about twelve leagues in circumference, well inhabited, situated on the equator. E. long. 120° 3', a town of Arabia, in the province of Ndesk; 150 miles E.N.E. of Hajar.

GIBEAH, in Bibliaire Geography, a city of Benjamin, the birth-place of Saul, the first king of Israel. (Josh. xvi. 24; Ezra ii. 26; Nehem. vii. 26.) Gibeah was about two leagues N. from Jerusalem. In Jerome's time it was entirely destroyed.

GIBEL-EL-TOR, a mountain of Palestine, anciently called Mount Tabor, which see.

GIBELET, or GIBHEL, a sea-port of Syria, anciently called "Gabala" and "Gabulon," situated on the coast of the Mediterranean, at the mouth of the river Jebel; 12 miles S.S.W. of Tripoli.

GIBELIN, a town of Palestine; eight miles E. of Gaza.

GIBELINS, GIBELINS, Gibelles, or Gibelines, a famous faction in Italy, opposite to another called the Guelphs.

The Guelphs and Gibelines ravaged and laid waste Italy for a long series of years; so that the history of that country, for the space of three centuries, is only a detail of their mutual violence and mortal wars.

The Guelphs frequently altered the power of the see of Rome, as the Gibelines did the emperor's right of sovereignty.
We have but a very obscure account of their origin, and the reason of their names: the generality of authors affirm, that they arose about the year 1240, upon the emperor Frederick the 11th's being excommunicated by pope Gregory IX.

That prince, fearing, to make a tour among the cities of Italy, gave the name Gibelins to such as he found well affected to him; and that of Guelphs to those who adhered to the pope. But as to the reason and signification of these words, there is a deep silence; Gibelin might be possibly formed of gebier, imperator; whence gebieretide, imperiope. Of gebier, the Italians might make, by corruption, Gibelin; so that Gibelins, in this light, should be the same with Imperiales, or such as followed the emperor's party.

By the way, some writers maintain, that the two factions arose ten years before; though full under the same pope and emperor.

Other historians relate, that Conrad III. marching into Italy, in the year 1149, against the Neapolitans, Roger, count of Naples and Sicily, in order to defend his states, called to his assistance Guelph duke of Bavaria; and that one day, when the two armies were ready to join in battle, the Bavarians cried out in High Dutch, lie, Guelph! or, as others say, in Flemish, hie, Guelph! that is, he, Guelph! and that the Imperialists answered on their side, with the words hie, or hier, Gibelin! here, Gibelin! calling the emperor by the name of the place where he had been bred.

Hornius refers the names to the war in 1149, between Henry the Proud, duke of Bavaria and Saxony, and Conrad III. duke of Swabia; the two princes preparing to engage near the town of Winberg, the Bavarians began to cry out Guelph, which was the name of duke Henry's brother; and the partisans of the emperor Weibelingen, which was the name of the place where that prince was born and bred, in the duchy of Wirtemberg, whose surname he bore: from which Weibelingen the Italians at length formed Gibelin.

This account is confirmed by Martin Cruiisus: "Initium Gibelinarum (Wibelinæ à patria Conradi regis) et Welfecne concertationes." Conrad being of Weibelingen, that word, says Cruiisus, gave rite to gikelinge, and that to gibelling, Gibelins, Gibelin.

Platina, on the other hand, affurses us, that the name Gibelins arose from that of a German at Piltaya; whose brother, named Guelph, gave likewise his name to the opposite faction: the two brethren, it seems, bearing an irreconcilable hatred. Others maintain, that the emperor gave the appellation Gibelin to those of his party, from the German word gieff, signifying ridge, or top; because the empire refted on them, as the rafters of a house leaue on the ridge, which joint them a-top.

Karus, a learned canon of Stralbourg, in the lives of the emperors of the house of Brunswick, is of the second opinion above related: in a battle, says he, between the Welf, or Guelph, and Frederic, the army of the first crying out, lie, Welf, lie, Welf! the second commanded his to cry out lie, Gibeling! lie, Gibeling! the name of his birth-place: and the French and Lombards asking the signification of those words, they were anfwered, that by Welf was meant the pope's party; and, by Gibelin, the emperor.

Yet others contend, that the word Gibelin is only a shortening of the word gibelinins, or gibelerteins; and that it arose from Guipert, an antipope, set up by the emperor Henry III. in the year 1080.

Among many other conjectures, Mainzbourgh, in his Hist. de la Decad. de l'Emp. adveine another opinion.

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that the two factions, and their names, arose from a quarrel between two very ancient and illustrious houses on the confines of Germany, that of the Henrys of Gibelinge, and that of the Guelphs of Adorf. See Machiavel.

It is said by fome, that the Gibelins, when driven out of Italy long after the year 1229, at which period the contell between them and the Guelphs ran very high, and settled at Amplieran, were the inventors of the mercantile practice of re-change, or re-exchange, on bills of exchange, on account of the damages and charges they were put to, and the interest of the money of their bills protested, which had been given to them for the effects they had been obliged to leave behind them. Anderson's Hist. Commerce, vol. i. p. 110. See Guelphs.

GIBELLO, in Geography, a town of the duchy of Parma, on the right bank of the Po; 16 miles N.W. of Parma. N. lat. 45° 1'. E. long. 10° 7'.

GIBEON, in Scripture Geography, the capital city of the Gibeonites, who availed themselves of the oaths of Joshua, and of the elders of Israel, on an artful representation which they made of their belonging to a remote country. (Joth. ix.) Joshua and the elders made an unavowed league with them; but upon a discovery of their misdeed, they spared their lives, and condemned them to the servile office of carrying water and water to the tabernacle, and other work of a similar kind, in token of their pufillanimitv and duplicity, as flaves and captives. In this rate of servitude they remained till the entire dispersion of the Jewish nation, A. M. 2553. The Gibeonites were defended from the Hivites, the old inhabitants of the country, and possessed four cities, viz. Cepherah, Beeroth, Kirjath-jeirm, and Gibon; the capital, afterwards given to Benjamin, excepting Kirjath-jeirm, which was defignated to Judah. The Gibeonites submitted to the burthen imposed upon them by Joshua, and continued faithful to the Israelites. Nevertheless Saul destroyed a very great number of them (2 Sam. xxii. 1, 2, 3, &c.); but God, as a punishment of his cruelty, in the reign of David, caused a great famine, which lasted three years (A. M. 2982. B. C. 1517); and David was informed by the prophets, that this calamity would continue as long as that cruelty, which Saul had exercised against the Gibeonites, remained unremitting. The Gibeonites, being asked what satisfaction they required, answered, "Seven of Saul's sons will we put to death, to avenge the blood of our brethren." Accordingly the Gibeonites crucified them in the beginning of spring, when, in Palestine, the barley-harvest commenced. From this time we find no mention of the Gibeonites, as forming a separate people. But they were probably included among the "Nethermen," who were public slaves appointed for the service of the temple. (1 Chron. xi. 2.)

Gibeon was situated on an eminence, as appears by its name, denoting a hill; it was 40 furlongs N. from Jerualem, according to Josephus. It is called "Gabaon" (see 2 Sam. v. 25, compared with 1 Chron. xiv. 16.) We find mention of the fountain and pool of Gibeon. (2 Sam. ii. 13.) The tabernacle and altar of burnt offerings, made by Moses in the wilderness, were removed to Gibeon. (1 Chron. xxix. 28, 30.) When Solomon was seated on the throne, he went to sacrifice at Gibeon, because this was the most considerable of all the high places where sacrifices were then tolerated, the temple not being yet built. (1 Kings iii. 4.)

GIBERT, BALTHASAR, in Biography, was born at Aix in 1602. He was educated partly at Paris and partly at Soissons. At the age of twenty-two he was appointed to teach philosophy at the college of Dauphine, and in 1688 he obtained...
GIB

obtained the professorship of rhetoric in the college of Ma-
varin at Paris, which office he filled with great reputation
more than fifty years. He was a zealous defender of the
privileges of the university, of which he was several times
denounced. He obtained other preferments connected
with the university, but on account of his opposition to the
revocation of an appeal made by the university against the
jailer Unigenitus, the court, in 1542, exiled him to Auxerre.
He died in the following year at the age of seventy-nine.
He was author of many works, in which are displayed
much erudition and solidity of judgment, but the style is
somewhat involved. Among his publications are "De la
veritable Eloquence;" "Reflexions sur la Rhetorique;"
"Jugemens des Savans sur les Auteurs qui ont traité de la
Rhetorique," in three volumes 12mo. Moreni.

GIBERT, Giambattista, a very learned prelate of the
church of Rome, was born at Palemon towards the close
of the fifteenth century. He visited Rome when he was
but twelve years of age, where he was distinguished for
the brilliancy of his talents, and was introduced to pope
Leo X., who entertained a great regard for him. He had
a thrill for polite literature, but was, at an early age, taken
from the pursuit, and placed in the service of a person
of high rank. By pope Clement VII., he was employed
in some very important legations to the king of France
and other potentates. In 1523 he obtained from his
patron the government of Tivoli, and in the following
year he was created bishop of Verona: he was not, how-
ever, allowed to take possession of his see, but was kept
at Rome as the adviser and friend of the pope. In 1527
Giberti was given as one of the hostages by the pope to
the Imperial army, on which occasion he underwent much
ill treatment, and was more than once threatened with
a shameful death. He was, at length, through the inter-
position of his friend, Cardinal Pompeo Colonna, restored
to his liberty, and retired to his bishopric, on which he con-
tinued to reside till his death, except when occasionally
summoned to Rome by Paul III. He died in 1543, and
his works, which were numerous, have been published col-
lectively; they chiefly consist of his constitutions and regu-
lations for the government of his church, which under his di-
finition became a model of ecclesiastical discipline. He
eradicated many abuses, and was profuse in alms to the poor.
He was the patron of learned men who returned to his palace,
among whom was the celebrated poet Flaminio. He
printed at his own expense, and under his own eye, several
works of the fathers, and in order to render his editions
correct, he entertained several Greek copyists. Moreni.

GIBET, or Gibbet, a machine in manner of a gallows
whereon notorious criminals, after execution, are hung in
iron, or chains; as spectacles, in terremor.

The word in French, gibet, properly denotes what we
call gallows; it is supposed to come originally from the
Arabic gîbe, mound, elevation of ground; by reason gibets
are usually placed on hills, or eminences.

GIBETS, the offals or entrails of a goose; including
the heart and liver, with the feet, gizzard, &c.

The word is supposed to be formed of gibeis, from the
French gieou, mouthful.

Gibets make a considerable article in cookery: they
boil gibets, stew gibets, make ragouts of gibets, glibets-
pies, &c.

GIBELEN, in Geography, a town of Egypt, on the
left bank of the Nile; 14 miles N. of Ama.

GIBLOS, a city on the coast of Phoenicia, between
Tripoli and Berytus; called also Byblis, which see.

GIBON, a town of the island of Cuba; 22 miles
N.E. of Bayamo.

GIBRALTEO, a town of Spain, in the province of
Seville, on the river Odell, with a harbour for small sailing
vessels; containing about 150 houses in two parishes, and
situated about 150 miles from the Atlantic on 44 miles of
Seville. N. lat. 37° 20′ W. long. 1° 14′.

GIBRALTEAR, derived from Gibr, an Arabic word
signifying mountain, and Tariik, the name of a Moorish ge-
neral, who conquered Spain and disembarked here in the
year 712, is a town of Spain, in the province of Andalusia,
but belonging to Great Britain, situated on a rock, at the
south extremity of Europe, and reckoned one of the
keys of Spain. This rock forms a promontory from Spain
into the sea, opposite another promontory extending from
Africa, bounding a narrow sea, which unites the Atlantic
with the Mediterranean, called in Latin "Fretum Herce-
num, or Gaditanaeum," and in English the Strait of Gibral-
tar. The length is about eight leagues, and the breadth,
in the narrowest parts, nearly five. On these two promo-
ntories are placed the famous mountains of Calpe in Europe,
and Abila in Africa, known to the ancients by the name of
the pillars of Hercules. From the top of the promontory
of Calpe, the eye commands an extent of 40 leagues, two
foss, and five kingdoms, viz. Seville and Granada, in Spain,
and Barbary, Fez, and Marocco, in Africa. In deca-
vooring to trace the town mentioned by Mela, Strabo, and
Pliny, under the names of Calpe, Cartheya, Melaria, Belo,
and Belepo, and also the promontory of Juno, situated
from east to west on the shore of the straits, no vantage is perceived,
except the mountain and city of Cartheya; which latter
was passed from the possession of the Phcenicians to that of
the Carthaginians, and is now reduced to a mere heap of
ruins, fearlessly defensible in the bay of Gibraltar, where
the Carthaginian tower was also situated. This ground is
now occupied by a mean farm. On ealling your eyes over
the kingdoms of Granada and Seville, you see the lofty
ridges of the desert du Corvo, as well as the mountains
of Hagen and Sarorra, and towards the east, opposite to
Gibraltar, the new town of Alzira. In the middle of this
incline you distinguish the ruins of Great Cartheya; at
a short distance, on a little hill, the town of St. Roche
is situated; on the east you perceive the chain of mountains,
called the Sierra de Ronda, abounding in fruits and aromat-
ics plants. Near these stood the town of Munda, so cele-
bated in Roman history as the scene of the battle between
the sons of Pompey and Augustus, when they were disputing
the empire of the world. The objects which bound the
horizon on the right are the Sierra Neveda, and the Alpujara-
na; on which the snow lies all the year. The mountains supply
a number of fountains and rivulets of clear water, forming
the sources of the Xouil and the Darro; rivers which water
the city of Granada and give fertility to the rich province of
Andalusia.

The promontory on the European side is joined to Spain
by an illusus, or neck of land, so narrow, that from some
places the rock has the appearance of an island. The length
of the illusus is about 200 paces; across which the
Spaniards have drawn a line and fortified it, to prevent the
garrison from having any communication with the country.

The form of the rocky mountain, on which the fortresses
of Gibraltar is built, is oblong; its summit is a sharp craggy
ridge, extending nearly from N. to S., almost three miles,
and in breadth no where exceeding 2 of a mile. The line
of its ridge is undulated, and the two extremes are some-
what higher than the centre. The summit of the Sugar-
loaf, which is the highest point towards the south, is elevat-
vated to the height of 1439 feet; the Rock-mortar, which is the highest eminence to the north, is 1350 feet; and the Signal-houses, which is nearly the central point between these two, is 1276 feet above the level of the sea. The western side of the mountain forms a series of rugged flanks, intersected with abrupt precipices. Its northern extremity is perfectly perpendicular, except towards the N.W., where what are called the Lines intervene, and a narrow passage of ground that leads to the illums, and is entirely covered with fortification. The eastern side of the mountain molly consists of a range of precipices; but a bank of sand, rising from the Mediterranean in a rapid ascendency, covers a third of its perpendicular height. Its southern extremity falls in a rapid slope from the summit of the Sugar-loaf into a rocky flat of considerable extent, called Windmill Hill. The principal malls of the mountain rock consists of a grey, dense marble; the different beds of which present to Spain a face of 1350 feet of perpendicular height, in a conical form. The bed, or strata, are of various thicknesses, from 20 to upwards of 40 feet, dipping in a direction from east to west, nearly at an angle of 35 degrees. In some parts of the solid mass of this rock, we find tectonic bodies entirely transmuted into the constituent matter of the rock, and their interior hollows filled up with calcareous spar; but these do not occur often in its composition, and its beds are not separated by any intermediate strata. This rock is suffering a slow, but constant deposition; and the uncovered parts of it present holes of various sizes, hollowed out of the solid rock, and apparently formed by the attrition of gravel or pebble, set in motion by the rapidity of rivers or currents in the sea; whence it is presumed, that, however high the surface of this rock may now be elevated above the level of the sea, it has once been the bed of agitated waters. On the west side of the mountain, towards its base, strata occur, which are of a different kind from the mountain rock. (See Major Imrie's mineralogical Description of Gibraltar in the Transactions of the Royal Society of Edinburgh, vol. iv.)

The first, or highest, forms the segment of a circle, its convex side being towards the mountain, and its slope being in that direction. This stratum consists of a number of thin beds; the outward one, which is the thinnest, is in a state of decomposition, and is mouldering down into a blackish-brown or ferruginous coloured earth. The beds below this increase progressively in breadth to 17 inches, where the stratification rests upon a rock of an argilaceous nature. This last bed, which is 17 inches thick, consists of a blackish-blue colour, in the septa or cracks of which are found quartz crystals, colourless and perfectly transparent. These crystals are composed of 18 planes, disposed in hexagonal columns, terminated at both extremities by hexagonal pyramids. The largest seen by major Imrie, did not exceed one-fourth of an inch in length; they generally adhere to the rock by the sides of the column, but are detached without difficulty. Their great degree of transparency has obtained for them the name of "Gibraltar diamonds." The rock is completely bathe with batteries, thrown up at all points, where the ascent could not be rendered completely inaccessible; so that from Europa Point, which advances farthest into the sea on the south side, to the highest part of the rock, which is that of the north (at about two miles distance from the other), there is not a single point, which is not put into a defensible condition. On the sides nearest Spain, the internal fortifications, made since the time Gibraltar was besieged by the combined armies of France and Spain, are anonishing. These improvements are principally owing to General O'Hara, the late governor; a great number of workmen having been employed about it, for eight years, at an immense expense. In order to form some idea of the labour expended on these fortifications, it will be sufficient to observe, that the excavations effected by the force of gun-powder, in the centre of the mountain, and in the solid rock, form vaults of such height and extent, that during a siege they are capable of containing the whole garrison. These caverns, of which the most considerable is the hall of St. George, communicate with the other batteries, established along the mountain by a winding road, passable on horse-back. On returning towards Europa Point, as you enter the town, your attention is engaged by considerable fortifications, barracks, magazines, and batteries, placed wherever the nature of the ground would admit. On the highest point of land the tower of St. George was built, under the directions of general O'Hara, who intended to raise it to a sufficient height for commanding the whole of Cadiz, and observing all that passed in that port; but the undertaking, being disapproved by the British government, was left in an unfinished state. Along the mountain are several grottos, or natural excavations, the most famous of which is that of St. Michael; the height of the entrance being 43 feet (varas) yards above the level of the sea. The cavern below is at least 70 feet, and contains columns of crystallizations and stalactites, resembling all the orders of architecture. About 100 paces from its gate is another beautiful cavern, 65 varas square, and the vault 21 varas high. On the right is a second excavation, adorned with capitals of marble similar to those of the former, but so regularly disposed, that it has the appearance of a temple. Perhaps this was formerly used for consulted some oracle, probably that of Hercules, who was the principal divinity of the place, as well as of the cave in the promontory of Ampelusia, on the coast of Africa. From the entry of this cavern you discover the whole of the bay of Gibraltar, two leagues across from east to west, and three from north to south. You also command a view of the country-houses, the flower and kitchen gardens, which the inhabitants have formed one above the other, on the side of the mountain, up to the royal road, and the public walk, extending for about half a mile from the town of Gibraltar to the new town on the south. The English have spared no pains in covering the rock with trees and flowers, in supporting the earth with walls and props, in cutting a number of roads through the solid rock, and in making them passable on horse-back and in carriages up to the very summit. They have even some artificial mounds for their flocks. From the grotto of St. Michael, situated on the southern part of the mountain, at an almost equal distance, the Signal tower and the Sugar loaf, the entrance of which is 8000 feet above the level of the sea, you discover the magazines, the batteries, the new town; from the south, the marine hospital, which is a handsome and convenient building. The view extends over a number of country-houses, to some of which beautiful gardens are attached; in time these new buildings will form a town as considerable as that of Gibraltar. Near these are eight magnificent cisterns, large enough to contain 40,000 tons of water, and bomb-proof; they receive all the water which flows down the side of the mountain, previously purged in copper cisterns for the purpose. On the south side you perceive a number of mountains, called Tarres; and near them formerly stood a very ancient tower, with a citadel and wall. In a cave not far distant several holes have been found with human bones above the corner lies; so strongly inclosed, they seem to form one solid mass. (See Pala/aces.) From Europa Point to the gate on the land-side, H}
are several moles, which facilitate the unloading of ships, and enable them to cast anchor in security. Before you arrive at the south gate you observe a handsome, large, square, surrounded with trees, now called the Field of Mars, formerly the Red Sand; of such a size, that the 6000 men, usually composing the garrison, can perform their manoeuvres without inconvenience. Here the guards always mutter, and on Sundays and holidays they make it the grand parade.

The prevailing forms of religion in this promontory are the Catholic, that of the church of England, and the Jewish, each of which has its own burying ground, among the sandy earth of the mountain.

The town of Gibraltar is on the west side at the foot of the mountain; it is large, well built, fortified with strong walls, battlements, and works to cover them; a large fort protects and marks the mole, built in the form of a bridge, 350 feet long; a church is built near it; and on the land side is another mole, which covers the part fortified by a fort with a tower, and two or three broad-works, thrown up at front. On entering the town by the south gate, you perceive on the left an edifice, containing the library of the officers of the garrison; containing many of the works of modern authors. The governor's house is built on the ground formerly occupied by the convent of Franciscans; to which is attached a beautiful garden, which, on Thursday and Sunday evenings, during the summer, is the promenade of the officers of the garrison and inhabitants of the city. The principal street into which you enter on leaving the governor's house, is the residence of the merchants, and on the right is the Catholic chapel, rebuilt in an excellent style of architecture; this street extends almost through the whole length of the city, being more than half a mile long, and on each side it has handsome flat pavements, and a number of shops from one end to the other. All the houses are built in the English style, with small doors, flat roofs, and enormous bow windows, behind which the prime goods of all sorts are exposed to sale. The inhabitants are chiefly military; the commerce with Africa is neither certain nor regular; and although the contraband trade with Spain, both in money and goods, is one of the principal branches of trade, that cannot be sufficient (says La Borde) to indemnify England for a million and a half of plate, which on an average it costs annually to maintain this point in the Mediterranean, where in other respects the duties collected are very small. This place is advantageously situated for victualing the fleets, and the protection of the coast of Africa, from whence the English procure their corn, and as a place of refuge for their privateers and sloops of war. The port is a key to the Mediterranean and to the Atlantic; confus'd from all the states of Europe and North America usually refide there. The Americans, as well as the Swedes, Danes, and Dutch, in time of peace, carry on a direct commerce with Gibraltar, by supplying themselves with the articles they want, and leaving in exchange fluff, cord, pitch, and tar, wines, rum, maize, rice, flour, ginger, pepper, sugar, cotton, aniseed, and the other articles of commerce, which they procure from Asia, Africa, and Europe. The exports of Granada, Seville, and Catalonia, furnish wine, and Africa wax and fresh meat in great quantities; they also import from Spain brandy, raisins, almonds, oranges, lemons, oil, salt, &c., which the vessels from the north carry back in exchange. Gibraltar contains altogether 9000 inhabitants, including eight regiments, amounting to 6000 men; so that this place is rather a military colony than a commercial establishment. The population of Gibraltar extends one mile to the south, and nearly as much towards the top of the mountain; and if we may judge from the new buildings lately erected, it is certainly increasing. All the houses are painted black on the outside, with white borders or ledges, shewing the number of stories, which are generally two or three. This mode is well suited to a country where the reflection of the sun is so violent. The police is well conducted; no persons are to be found here; the streets are prepared clean and fabulous; and though they are all well lighted at night, no one is allowed to walk without a lanthorn, and a permission from the general; sentinels requiring answers to their challenges being stationed in the town, as well as patrols and watchmen. All forms of religion are tolerated without inconvenience, and the number of Jews, who live here more securely than in any other part of Europe, is very considerable. Gibraltar has a theatre, which, though small, is well laid out and adorned with taste. For want of regular actors, the officers of the garrison perform, during the greater part of the year, a number of English plays.

On the opposite side of the straits of Gibraltar is the town of Ceuta. The traveller, who wishes to cross over into Africa, may take advantage of the N.W. winds, and of the small vessels which are continually plying and stopping at this place. This fishery is of little consequence; but it is held in the obscurity of time. It is certain, however, that the Phoenicians, the Egyptians, and other ancient people, landed at Gibraltar; and the name of the pillars of Hercules, by which this place was known, is nothing more than a tradition preferred among the Phoenicians, who people this coast, and brought their gods and religious worship with them. But it is not known whether the straits or columns existed in the remotest antiquity, and if the inscription "non plus ultra" meant that nothing was more wonderful than the separation of the two continents, or as is more probable, that no one had dared to navigate beyond this point. However this be, it is probable that the first navigators of the Mediterranean landed at Gibraltar, or its environs. This opinion is supported by the authority of Pomponius Mela, who, being born at Cadiz, may be supposed to feel more interest in others in whatever related to this coast. The Moors seized on Gibraltar in the eighth century, and held it without interruption till the fourteenth, when, in the year 1310, it was taken from them by Perez de Guzman; but they retook it in the year 1352, and held it till the year 1462, when it was retaken by the Spaniards, and it has continued in the hands of the Christians from that time. The English took it from the Spaniards during the war of the succession in Spain; the fort surrendered to the united fleet of England and Holland under Sir George Rook, in 1704; and the allies took possession of it in the name of Charles III. The place was ceded to the English by the treaties of Utrecht and Seville; it was besieged at several times without success. Since the English have been masters of the place it has been so much improved and strengthened, as probably to bid defiance to the utmost efforts of an enemy. In the course of the American war, the Spaniards again besieged it; but their memorable attack with floating batteries of upwards of 200 cannon, in ships of all sizes, terminated only in disappointment, in the destruction of the ships and men employed, and in the immaterial honor of the brave defenders; 16 miles N. of Ceuta, 70 S. of Seville, N. lat. 36° 44', W. long. 5° 19' 46".

GIBRALTAR, an ancient town of South America, in the government of Caracas, and province of Venezuela, situated on the E. coast of the lake Maracaibo. The country in its vicinity is well watered with rivers, and furnishes coca of the best quality, and very large eddars. The best Spanish tobacco is produced here, called Tobago de Maracaibo, from which is made the valuable fluff, vulgarly called "Mackaba" fluff. The air is very infaubrous in the rainy season, and therefore...
the merchants and planters retire at that time to Maracaybo, or Merida; 100 miles S.S.E. of Maracaybo. N. lat. 16° 4'. W. long. 67° 36'.

GIBRALTAR Point, is the western extremity of a sandbank, in Upper Canada, which forms the harbour of York, and upon which block-houses are erected for its defence. There is another place of this name on the fide of lake Memphramagog, in the town of Bolton, in Upper Canada.

GIBRIN, a town of Syria; 10 miles S.E. of Aleppo.

GIBSON, Richard, in Biography, the Dwarf, was placed by a lady at Mortlake, to whom he was page, with Francis de Clyne to learn to paint, both in water and in oil; but he informed himself more by studying the works of Lely, and gained considerable reputation.

GIBSON, Edward, in Biography, was born at Bampton, in Wernsland, in the year 1660. He received the early part of his education at the free-school in his native town, and at the age of seventeen he was sent to Queen's college, Oxford. In 1681 he was admitted to the degree of B.A., and in the same year, having already applied himself most diligently to the study of the northern languages, he published a new edition of William Drummond's Polonia, Middiana, and James V. of Scotland's Cantikena Rafience, quarto, illustrated with notes. In 1692, he gave a translation in the Latin language, together with the original, of the "Chronicum Saxonicum," likewise a work entitled "Librorum Manuscriptorum in duabus insignibus Bibliothecis, altera Dugdaliana Oxoni, Catalogus," with a dedication to Dr. Tennison, afterwards archbishop of Canterbury, which proved the foundation of the author's subsequent fortune under the auspices of that prelate. He next published a correct edition of Quintilian "De Arte Oratoria," and a new edition of Somner's treatise on the Roman ports and forts in Kent. In 1694 Mr. Gibson commenced A.M., and shortly afterwards was elected fellow of his college, and admitted into deacon's and priest's orders. In 1695 he published an English translation of "Camden's Britannia." This work was patronized by lord Somers, who offered Mr. Gibson a living in the isle of Thanet, which he declined, on account of ill-health, and in the following year he was appointed librarian at Lambeth, by the archbishop, Dr. Tennison, who received him into his family, and who appointed him morning preacher at Lambeth church. His publications during this period were, "Vita Thomas Bodleii, Equitis Aureus," together with "Historia Bibliothecae Bodleiana" also, "Reliquiae Spelmanniae; being the posthumous works of Sir Henry Spelman, relating to the Laws and Antiquities of England, together with the Life of the Author." He was now appointed domestic chaplain to the archbishop, through whose means he obtained the lecture-ship of St. Martin's in the Fields, and was presented to the rectory of Stifled in Essex. His promotion in the church went on rapidly, but it did not render him indifferent to the ease of literature, and in 1714 he published his celebrated work, entitled "Codex Juris Ecclesiasticus Anglicani; or the statutes, constitution, canons, rubrics, and articles of the church of England, methodically digested under their proper Heads." The scheme of church power vindicated in this volume was excepted against, not only by dissenters, but by the found and most constitutionall lawyers within the pale of the church; who maintained that the principles and claims advanced in it would be sufficient, if acted upon, in their utmost extent, to establish a facerdotal empire, which must draw all power to itself, and render the civil magistratise its minister and dependent. In 1715 our author, who had taken his degree of D.D., was consecrated bishop of Lincoln, and in 1723 he was translated to the see of Lond
don. In this situation, on account of the weak health of Dr. Wake, then archbishop of Canterbury, almost every thing relating to the affairs of the church was confided to him. His great zeal for the established religion, and his opposition to the dissenters, who were endeavouring to obtain the repeal of the Corporation and Test acts, invited him in the estimation of the prime minister, for Robert Walpole; and he was, about the same time, rendered obnoxious to men in power, by several attacks on the principles in his "Codex," which the authors contended were inimical to the civil constitution of this country, and favourable to a spirit of intolerance and persecution. Of these attacks, one of the most able was conducted by the recorder of Brittol, afterwards Mr. Justice Fuller, at the desire of lord Hardwicke, lord chief-justice of the court of king's bench. Bishop Gibson's constitution was naturally strong and vigorous, but he exercised it with almost incredible labour, so that, at length, it might be said to be fairly worn out by his studies and exertions. For some time before he died, he became sensible that his end was approaching, and in 1748 he breathed his last at Bath, being in his seventy-ninth year. Besides the works already enumerated, the bishop was author of several others, highly esteemed by the learned. He wrote and published many pastoral letters, addressed to the clergy and laity of his diocese, intended to oppose the growth of indulgence and enthusiasm; some visitation charges, occasional sermons, and small tracts against the prevailing vices of the age. These smaller pieces have been frequently reprinted, and it is said that the bishop received more real satisfaction on account of the repeated demand for his practical works, than from the honours conferred on him by his larger and more learned treatises. He possessed the social principles in an eminent degree, and his benevolence and charity were very extensively, though privately, exercised. An instance of liberality is recorded, which redounds greatly to his honour: Dr. Crow had left him by his will 25£, which bishop Gibson freely gave to Dr. Crow's own relations, who were in indigent circumstances. Wob., Brit.

GID, or GIDDY, in Rural Economy, a morbid condition occurring in sheep and some other animals, in which there is a constant vertigo or turning round. The affection is generally considered as a kind of hydrocephalus, or encysted collection of watery matter in the head, between the dura and pia mater.

It has, however, been suggested by some as depending upon a worm or maggot under the horn on either fide of the head; in support of which Mr. Collins has been informed of cows having the disease, and being cured by having a perforation made near the horn, and the worm or maggot taken out; but this is no doubt another sort of disorder.

Some farmers consider this complaint as the most common among sheep that are richly fed, and know it by the name of the flurry evil, the cure being attempted by the use of small bleeding and astringents; and in order to guard against a relapse, the sheep should be put into a chilly or elevated situation.

Among the graziers in the county of Lincoln the disease is known by the terms flurry, and bladder on the brain, and in its remedy a sort of SOPPRESSES process has been recomended, by which great numbers of sheep are supposed to be faved. The person who performs the operation raises the scalp with a strong hooked knife just over the part affected, to the extent of about half a crown piece, after which, nearly the same extent of the skull-bone is elevated, letting it hang as by a hinge on one side; then by means of a quill, cut planting to a point, in the form of a spear, and lanced on each side, the bladder is sought for and brought out whole, the
bone being immediately put down again, and covered with a
plaster.

The South Down sheep farmers, when the animals are af-
fected in this way, say they are paterif.

Various other modes of cure have been proposed, but
they do not seem worthy of much attention. See Sheep.

GIDDA, in Ancient Geography, See JIDA.

GIDDATOOR, in Geography, a town of Hindoostan, in
the circuit of Ciscále: 16 miles S.W. of Cofimcutta.

GIDDINESS, in Medicine, a sensation as if the objects
surrounding the person were in a state of circumjegation,
or whirling motion, accompanied with an inability to main-
tain the erect posture, or to move forward in a straight line;
in technical language this is denominated Vertiges; which
see.

GIDDRI, in Geography, a town of Albania: 8 miles
N. of Achilles.

GIDEA, a river of Sweden, which rises in the Lapp-
mark of Aicle, and traversing Angermanland, runs into the
gulf of Bothnia. N. lat. 16° 20'. E. long. 18° 54'.

GIDELI, a town of Candahar: 50 miles S.E. of Cal-
bul.

GIDID, a town of Africa, in Dar-fur, nearly S.E. and
about 22 miles from Cobbié, on the road from Cobbié to
Ril. This town has a competent supply of water; and yet
the Fukkara, who populate it, are supposed to be so deftite
of hospitality, that they will hardly furnish a traveller suf-
ficient to allay his thirst. In this town are many houses,
and some of them belong to merchants who derive their ori-
gin from the southwards. — Allo, a town of Nubia: 55 miles
S. of Gerii.

GIDI-SHEHRI, a town of Asiatic Turkey, in Nato-
lia: 8 miles S. of Beilbeh.

GIDOLA, a town of Libya, in the government of Wi-
buig: 20 miles N. of Wiburg.

GIEH, a town of Germany, in the bispohric of Bam-
berg: 7 miles N. of Bamberg.

GIEDKULISZKI, a town of Samogitia: 24 miles S.
of Roiffonne.

GIEDROYCE, a town of Lithuania, in the palatinate of
Wilna: 24 miles N.N.W. of Wilna.

GIEDDUNGEN, a town of Norway, in the diocese of
Christianland: 18 miles N.W. of Stavanger.

GIEGUZIN, a town of Lithuania: 15 miles S. of
Witkermes.

GIER, in Botany, the Ceylon name of a small fruit,
described by Gortzer v. 2, 486. t. 186, of which nothing
more is known. The nucleus is singularly fitted, like a Ru-
lus, but if the figure be in all points correct, it cannot be
2 grain of the fruit of that genus. The internal parts, which
were decayed, might have afforded somethings decisive,
especially the situation of the embryo.

GIELLUM, in Geography, a town of Norway, in the
diocefe of Aggerhus: 55 miles N. of Chiriltiana.

GIEI, a town of France, and principal place of a
district, in the department of the Loiret, seated on the Loire;
32 miles S.E. of Orleans. The place contains 5117, and
the canton 11,356 inhabitants, on a territory of 410 kilo-
meters, in 11 communes. N. lat. 48° 45'. E. long. 10°
13'.

GIENE'. See KEN.

GIENSOR, a town of Africa: 10 miles S. of Tri-
poli.

GIER, a river of France, which runs into the Rhine,
12 miles below Lyons.

GIERACE, a town of Naples, in Calabria Ultra, the
see of a bishop, suffragan of Reggio: containing 13
churches, and 4 monasteries. Near it are some sulphureous
baths: 34 miles N. of Reggio. N. lat. 38° 6'. E. long.
16° 30'.—Allo, a town of Sicily, in the valley of Demo-

nes: 30 miles S.W. of Milletta. N. lat. 37° 48'. E. long. 14°
22'.

GIERANONY, a town of Lithuania, in the palatinate of
Wilna: 20 miles N.E. of Lida.

GIERGA, a town of Bengal: 48 miles S.E. of Doc-
fa.

GIESIM, a town of Nubia, between Sennar and Abyb-
fiita: 150 miles E.S.E. of Sennar. N. lat. 13° 16'.
E. long. 35° 15'.

GIESSEN, a strong town of Germany, in the princip-
ality of Upper Hesse, situated in a fertile country, on the
Lahn. It is defended by a good citadel and arsenal.
An university was founded here in the year 1605; 36 miles
N.E. of Mainz. N. lat. 50° 35'. E. long 8° 43'.

GIEZIN, a town of Samogitia: 22 miles E.S.E. of Ro-
iffonne.

GIPFE, a term in Surgery, signifying dwellings behind
the ears.

GIFFEN, Hubert, in Biography, a lawyer and philo-
logist, was a native of Gueldres in France. He studied at
different universities, as those at Louvain, Paris, and Or-
leans, and in 1567; he took his degrees in the law. He
went to Venice in the train of the French ambasfaador, and
from thence to Germany, and taught philosophy and juris-
prudence at Strafiburg, Altdorf, and Ingolstadt. He was
educated in the principles of Protestantism, which he re-
nounced for the Catholic religion previously to his being
invited to the imperial court, where the emperor Rodolph
bowed upon him some important offices. Being sent into
Bohemia, he died at Prague in the year 1604, being about
seventy years of age. His principal works are "Comment,
de Inip. Juliano": "Index Hist. Rerum Romanorum"; and
notes and comments upon Arifiotis's politics, ethics;
also upon Luceritus. Moreri. Bayle.

GIFT-MEHL, the name given by the German cheme-
ists and metallurgists to the first appearance of arsenic,
or the grey flowers arising from the roasting of cobalt;
and sticking to the long wooden funnel, which they carry from the
furnaces.

The word gift-black is German, and signifies poisonous
meal or brand.

GIFHORN, in Geography, a town of Germany, in the
principalities of Luneburg-Zell, seated on the Aller: 19
miles E. of Zell.

GIFONI, a town of Naples, in Principato Citra: 7 miles
E. N. E. of Salerno.

GIFT, or GRANT, in Law, a method of transferring
peronal property, anferring in some measure to the con-
veyances of real estates. Gifts and grants are thus to be difin-
guifed from each other, that gifts are always gratuitous,
whereas grants are upon some consideration or equivalent.
With regard to their subject-matter, they may be divided
into gifts or grants of chattels real, and gifts or grants of
chattels personal. Under the former chufs may be included
all leaves for years of land, assignments, and surrenders of
these leaves; and all the other methods of conveying an estate
less than freehold; though these very seldom carry the out-
ward appearance of a gift, however freely bellowed; being
usually expressed to be made in consideration of blood, or
natural affection, or of the property possessed by, or
owed to the grantor; and in case of leaves, always referring a rent,
tough it be but a pepper-corn — any of which considerations
will, in the eye of the law, convert the gift, if execut-
ated, into a grant; if not executed, into a contract.

Grants
Grants or gifts of chattels personal are the act of transferring the right and the possession of them; whereby one man renounces, and another man immediately acquires, all title and interest therein: which may be done either in writing or by word of mouth, attested by sufficient evidence (Park. § 57.), of which the delivery of possession is the strongest and the most essential. But this conveyance, when merely voluntary, it somewhat suspicious; and is usually confined to be fraudulent, if creditors or others become sufferers thereby. And, particularly, by statute 3 Hen. VII. c. 4, all deeds of gift of goods, made in trust to the use of the donor, shall be void: because otherwize persons might be tempted to commit treason or felony, without danger of forfeiture; and the creditors of the donor might also be defrauded of their right. And by statute 13 Eliz. c. 5, every grant or gift of chattels, as well as lands, with an intent to defraud creditors or others (3 Rep. 82.), shall be void, as against such persons to whom such fraud would be prejudicial: but, as against the grantor himself, shall stand good and effectual; and all persons partakers in, or privy to, such fraudulent grants, shall forfeit the whole value of the goods, one moiety to the king, and another moiety to the party grieved; and also, upon conviction, shall suffer imprisonment for half a year.

A true and proper gift or grant is always accompanied with delivery of possession, and takes effect immediately; as if A. gives to B. a cask of wine, and puts him in possession of them directly, it is then a gift executed in the donor; and it is not in the donor's power to retract it, though he did it without any consideration or recumence (Litt. 109.); unless it be prejudicial to creditors; or the donor were under any legal incapacity, as infancy, coverture, durea, or the like; or if he were drawn in, circumvented, or imposed upon by false pretences, bribery, or surprize. But if the gift does not take effect, by delivery of immediate possession, it is then not a proper gift, but a contract; and this a man cannot be compelled to perform, but upon good and sufficient consideration. See Contract.

The conveyance by gift, "donatio," is properly applied to the creation of an estate-tail, as feuominium is to an estate in fee, and lease to that of an estate for life or years. It differs in nothing from a feomium, but in the nature of the estate passing by it; for the operative words of conveyance in this case are do or dedi (Welt. Symbol. 256.); and gifts in tail are equally imperfect without littery of feomium, as feeominiums in fee-simple. (Litt. § 59.) See Feeominium. This is the only distinction which Littleton seems to take, when he says (§ 57.), "it is to be understood, that there is feomium and feuominium, and donor and donee, lefser and lefser;" while, scorr is applied to a feuominium in fee-simple, donor to a gift in tail, and lefser to a lease for life, or for years, or at will. In common acceptance gifts are frequently confounded with grants. (See Grant.) Blackf. Com. B. ii.

Gift-day, in Rural Economy, is a term implying a boon-day, or a day's work given from the tenant to the lord, or from neighbour to neighbour.

Gifts, New Tear. See STRANGE.

GIG. Fish. See FISH-gig.

GIGA, Ital. Giglio. Fr. a jig, the name of a gay dance, and of its tune. The Cruton Dict. defines this word from Dante, par. 14. strumento musicale di cordi; a musical instrument with strings. The Cruton, likewise, says, that it is an instrumental movement, so called.—Walther's derivation from Scigo, Germ. a violin, or fiddle, comprehends both the tune and the instrument upon which, originally, it was most frequently played. The time of the gig, or jig, is always quick, and in triplets of 6, 9, or 12.

Corelli's jigs were long in favour; but, being in the fine time as most of our old country-dances, they are almost all become vulgar, except the giglio in his 5th solo, and 11th sonata, op. ii.

Roufseau says that jigger are now wholly out of fashion in Italy and France; but the movement is only improved by new and more elegant passages: for, whatever is played quick, in triplets of 6, 9, or 12 quavers in a bar, is still a gig, or jig.

GIGAIA, GIGHA, GIGA, or GIGO, in Geography, one of the smaller western islands of Scotland, about 7 miles long and 2½ broad, partly rocky and partly arable. Situated in N. lat. 55° 46', W. long. 5° 43', and separated from the peninsula of Cantyre, or Kintyre, by a channel 38 miles broad. There are no trees in this island; but oak are sometimes dug up in the morasses. Near its centre is Dun-cliff, a high steep rock, flat at top, which appears to have been a strong fortification. At Kilchattan is a rude column, 16 feet high, 4 broad, and 8 inches thick, and near it is a cairn. On the western shore, which is bold and rocky, there are two remarkable caves; and on the S. coast is a subterraneous passage 133 feet in length. Between the projecting points and fink rocks on the E. coast are creeks, in which veslets may be safely moored. This island contains 592 inhabitants.

About 1½ mile S. from Gigha, is the island Caray, or Cara, near a mile long and half a mile broad, containing 22 inhabitants. The shores are everywhere high and rocky, except at the N. E. end, where is the only landing place. The Mull of Cara, at the S. end, is a perpendicular rock 167 feet high. At the N. E. end, the soil is a mixture of hills, sand, and common mould; the rest of the island, at the surface, is a stratum of peat earth. Between Gigha and Cara is Gigulam, a small uninhabited island.

GIGANTES, a cluster of small islands among the Philippines, N. W. of Sibu. N. lat. 11° 42'. E. long. 123° 20'.

GIGANTIC. See Giant.

GIGANTIC, Or Architectura, a name given by Scamozzi and others to the Tuscan order.

GIGANTOMACHIA, the battle of the giants against the fabulous gods of the ancient heathens. See Giant.

The word is Greek, γίγαντομαχία, formed of γίγαντα, giant; and μαχαί, combat, of μαχαίρι, pugn., fight.

Several of the poets have composed gigantomachias: that of Scarron is the finest of all his pieces.

GIGANTOPHONTES, is a name given to Minerva, on account of the assistance which she gave to Jupiter in his combat with the giants.

GIGAY, in Geography, a small island of the Hebrides, on the E. coast of Burray, yielding tolerable pasture, but difficult of access.

GIGERI. See JUEL.

GIGERIE, a term used by some writers to express the offals of poultry of any kind, including the intestines, extremities, and whatever else is thrown away before the dressing. See Giblets.

GIGG, GIGA, or JIG, in Music and Dancing. See GIA.

Gigos, among Farriers, small bladders or blisters on the inside of a horse's lips. They must be laid open, and cleansed with salt and vinegar, or alum-water.

GIGGE, in the Manufacture of Flax, denotes a hole made in the earth, where fire is made to dry the flax laid over it.

GIGGE, Anthony, in Biography, a learned Italian, who flourished in the early part of the seventeenth century, and was admitted to the degree of doctor by the Ambro-
G I L

fian college at Milan. He was author of many learned works, but that on which his reputation is chiefly established, was entitled "Thefaurus Linguæ Arabicae, seu Lexicon Arabico-Latinum;" published in four volumes folio, in 1632.

As a recompence for the learning and industry which it exhibited, pope Urban VIII. nominated the author to an honourable post in a college at Rome; but he died before he could enter upon its functions, or enjoy its emoluments. Gen. Biog.

GIGLIO, or ISOLE DEL GIGLIO, in Geography, a small island in the Mediterranean, near the coast of Italy, anciently called Agilum, or Isigum. N. lat. 42° 28'. E. long. 10° 53'.
Gilbert, or Gilbert, William, a physician, was born in the year 1653, at Coleheffer, of which borough his father had been recorder. After studying some time at Cambridge, he travelled abroad for farther improvement in those branches of science to which he was particularly addicted; and took the degree of doctor of physic in some foreign university.

He returned to his own country with a high character for philosophical and chemical knowledge, and was made a member of the College of Physicians in London, where he lived and died. He was distinguished as a learned man, and had a high reputation and success. The vacancies from the duties of his profession which he succeeded in the pursuit of philosophical experiments, particularly relative to the magnet, and in these he was assisted by a pension from Queen Elizabeth. We are informed of no other circumstances concerning the life of this learned man, who died, unmarried, November 20, 1683, aged 63, and was buried in his native place, where a handsome monument was erected to his memory by his brothers. He left all his books, globes, mathematical instruments, and cabinet of minerals, to the College of Physicians. His picture, which represents him as of a tall stature and cheerful countenance, is in the gallery over the schools at Oxford.

The capital work of Dr. Gilbert, entitled "De Magnete, Magneteque Corporibus et de Magneto Magnete Tellure, Physiologia Nova, plurimis argumentis et experimentis demonstrata," was first published at London in 1600, and has been reprinted in Germany. This is not only the earliest complete system of magnetism, but also, one of the first specimens of a philosophical system built upon experiments, after the manner so much insisted on afterwards by the great lord Bacon. Akin, Biog. Mem. of Med. Loyal.

Gilbert, John, the son of Mr. Thomas Gilbert, a gentlemanpossessing an estate of about 300l. a year, was born in the year 1723. His eldest brother had a liberal education, with a view to the bar, and became afterwards a member of parliament for Newcastle and Litchfield; but the subject of this article had only such instruction as the obscure village of Farley, in the neighbourhood of his father's house, could afford. At the age of twelve or thirteen years, he was bound apprentice to Mr. Bolton, father of the well-known and justly celebrated Matthew Bolton, of Soho, near Birmingham; between whom and Mr. Gilbert an intimacy subsisted, as long as the latter lived. At the age of 19 he left his father; and as he died of extensive liverworks, they required attention. Accordingly Mr. Gilbert, in order to undertake the superintendence of them, quitted his connection with Mr. Bolton, who very reluctantly parted with him, and devoted himself to the management of his own family concerns. Notwithstanding the disadvantages under which Mr. G. had laboured in early life, he possessed talents, which, matured by age and experience, could not fail of recommending him to notice. But the most remarkable circumstance in the history of this ingenious person, and that indeed which has induced us to give a brief account of him, was his introduction to the duke of Bridgewater, at the time when he was projecting improvements of his collieries, in the neighbourhood of Manchester. Mr. Gilbert's brother was then steward to the duke; and he advised him to inspect and examine his Grace's collieries at Worsley. After viewing the works, it immediately occurred to him, that if the coal on that part of the duke's estate could be brought to market in such a populous town as Manchester, and for the supply of the numerous works in its vicinity, the collieries, which, in the state it was at the time of his inspection, yielded little profit, would become extremely valuable. It is said, that he induced himself altogether from company for two days, at the Bull inn at Manchester, to consider how this might be done by water-carriage, as that by land was very expensive, and, on account of the badness of the roads, very inconvenient, and almost impracticable. Having digested his scheme, he communicated it to the duke, who was no less struck with the proposition suggested by Mr. G. than the projector himself. Accordingly the work was taken in hand after began. Mr. G.'s name has seldom or never occurred in connection with this very important and lucrative undertaking; and as he proceeded Mr. Brindley in the business, of which we have ample and satisfactory evidence, we thought that justice required a candid and impartial statement of the facts. Mr. G. was so fortunate, in the prosecution of this work, as to find line upon the duke's estate, which much otherwise would have been brought by land from Buxton, at the distance of near 50 miles; and in a work of this great extent, this was no incommoder saving. The tunnel was entirely executed, as well as planned, by Mr. G.; who, being acquainted with Mr. Brindley as a neighbour, and knowing him to be a very ingenious and excellent millwright, engaged his assistance in the conduct and completion of the arduous undertaking, and introduced him to the duke for this purpose. The duke was so well satisfied with his agent and projector, that at first they lived together for two or three months in the year, and for several of the last years of Mr. Gilbert's life, he spent half his time with him. In June, 1757, he removed with his family to Worsley, that he might, with greater convenience, attend to the prosecution of the business he had undertaken. As a further evidence of the duke's regard for Mr. G. we may here add, that he gave his son, who was educated for the church, the second-bast preferment at his disposal, to the amount of about 1200l. per annum. We might mention many other concerns in which Mr. G. was engaged, and in which he had an opportunity of manifesting his skill and judgment, in the conduct of canals, mines, and other improvements relating to rural economy. We shall merely add, that he is said to have been the first person who suggested the use of gun-powder in obtaining rock-fall. Mr. G. was probably too modest and unassuming, that he did not, during his life-time, lay claim to the honour which belonged to him, with respect to the duke of Bridgewater's canals and collieries; and we have introduced his name into the Cyclopaedia, in order to do him justice, without meaning to detract from the merit of his coadjutor and successor, Mr. Brindley, to whom we have already paid ample and deserved respect under his biographical article. Mr. Gilbert's general character commanded the esteem of all who knew him, and his death, even after a prolonged life of about 75 years, which happened at Worsley, on the 4th of August, 1757, was, without doubt, regretted by his friends, and especially by the noble duke, who was in the house at the time.

Gilbert's Island, in Geography, an island near the S.W. coast of Terra del Fuego. Lat. 53° 57' W. long. 74° 17'.

Gilbert's Town, a town of America, in the state of Virginia, seated on the Shenandoa, 30 miles N. of Charlottesville.

Gilbertines, in Ecclesiastical History, an order of religious, thus called from St. Gilbert, of Sempringham, in the county of Lincoln, who founded the same about the year 1148: the monks of which observed the rule of St. Augustine, and were accounted canons; and the nuns that of St. Benedict.
The founder of this order erected a double monastery, or rather two different ones, contiguous to each other, the one for men, the other for women, but parted by a very high wall.

St. Gilbert himself founded thirteen monasteries of this order, viz., four for men alone, and nine for men and women together, which had in them seven hundred brethren, and fifteen hundred sisters. At the dissolution there were about twenty-five houses of this order in England and Wales.

GILBERTUS ANGLICUS, in Biography, the first practical writer on medicine, whom this country produced, is placed by Bale, (who calls him Gilbertus Legenus, and says he was physician to Hubert, archbishop of Canterbury,) in the reign of King John, about the year 1210. But Leland, without stating the grounds of his opinion, makes him more modern. Dr. Freind observes, that it is obvious, from the work by which he is principally known, (a "Compendium of Phyfic,"') that he must have lived several years later in the thirteenth century; very probably in the beginning of the reign of Edward I. "For he quotes Avrerehs;" Dr. Freind remarks, "who reached to the close of the twelfth century; and whose works could not have been translated to early, and indeed were not translated till the middle of the thirteenth, as Bacon, a good voucher, informs us; and the mention he makes of a hook, "de Speculius," which, without doubt, is written by Bacon, and what he transfers from Theodoric, concerning a leprosy, evidently shews that he lived lower in this century, &c." (Hist. of Phyfic, vol. ii. p. 267.) According to Leland, he maintained a high character for his knowledge in philosophy and physic, which he had acquired by great study and much travelling; and he was very successful in his practice. His writings are principally compiled from those of the Arabian physicians, like the works of his contemporaries in other nations; sometimes, indeed, he transfers the whole chapters word for word, especially from Rhazes. He is represented as the first English physician who ventured to expose the absurd practices of the superstitious monks, who at that time engrossed much of the treatment of diseases, and is said to have contrived with them the methods recommended by the ancients. The principal work of Gilbert, entitled "Compendium Medicina tam morborum univerfalis quam particularium," was corrected by Michael Capella, and printed at Lyons in 1510; and afterwards at Geneua, in 1608, under the title of "Laurea Anglaca, seu Compendium totius Medicinae." His other treatises were, "De viribus Aquarum;" "De Res Herbaria;" "Theaurum Pauperum;" and "De tuenda valetudine." Eloy, Dict. Hist. Freind, loc. cit.

GILBING, in Geography, a town of Prufin, in Ermland; 12 miles W. of Allenheim.

GILBOA, in Scripture Geography, a mountain of Palestine, celebrated on account of the defeat and death of Saul, and his son Jonathan. (1 Sam. xxxi. 1, 2, 3.) Ezechias and Jerom place this mountain six miles from Bethan, otherwise Scevthopolis.

GILD, or GUILD, originally signifies a fraternity, or company.

The word is formed from the Saxon gildan, to pay, because every man was gildcr, i.e. to pay something towards the charge and support of the company. Hence also our Guild-hall, q. d. the hall of the society or fraternity, where they meet, and make orders and laws among themselves.

The origin of gilds, or guilds, is thus related: it being a law among the Saxons, that every freeman of fourteen years old should find aventure to keep the peace, or be committed; certain neighbours, consisting of ten families, entered into an association, and became bound for each other, either to produce him who committed an offence, or to make satisfaction to the injured party: that they might the better do this, they raised a sum of money among themselves, which they put into a common floc; and when one of their pledges had committed an offence, and was fled, then the other nine made satisfaction out of this floc, by payment of money, according to the offence.

Because this association consisted of ten families, it was called a decennary; and from hence came out later kinds of fraternities.

But, as to the precise time when these guilds had their origin in England, there is nothing of certainty to be found; since they were in use long before any formal licence was granted them for such meetings.

It seems to have been about the close of the eleventh century, says Anderson, in his History of Commerce, vol. i. p. 70, that merchant-guilds, or fraternities, which were afterwards styled corporations, came first into general use in many parts of Europe. Mr. Madox, in his Sira Burgi, chap. i. § 9, thinks, they were hardly known to our Saxon progenitors, and that they might be probably brought into England by the Normans; although they do not seem to have been very numerous in those days. The French and Normans might probably borrow them from the free cities of Italy, where trade and manufactures were much earlier propagated, and where possibly such communities were first in use. See Charters of Community, City, and Corporation.

Edward the Third, in the fourteenth year of his reign, granted licence to the men of Coventry to erect a merchant's guild and fraternity, of brethren and lifters, with a master, or warden; and that they might find charters, below alms, do other works of piety, and constitute ordinances touching the same.

So Henry the Fourth, in his reign, granted a licence to found a guild of the Holy Cross, at Stratford-upon-Avon.

GILD, in the royal boroughs of Scotland, is still used for a company of merchants, who are freemen of the borough.

Every royal borough has a dean of gild, who is the next magistrate below the bailiff. He judges of controversies among men concerning trade; disputes between inhabitants touching buildings, lights, watercourses, and other nuisances; calls courts, at which his brethren of the gild are bound to attend; manages the common flock of the gild; and enormes, and collects fines.

GILD, or Gold, according to Camden, also signifies a tribute, or tax. See Gold.

GILD, according to Crompton, also signifies an amercement. As in foot-gild, which he interprets a pretation within the forfeit.

Hence, to be quit of all manner of gild, is to be discharged of all manner of prelutions to be made for gathering heaves of corn, lamb, and wool, to the use of foresters.

GILD, or Geld, is also used among our ancient writers for a compenation, or malte, for a fault committed. See Un-Geld.

Hence, =eurgeld is the price of a man; or geld is the price of cattle; angeld, the fingle value of a thing; twigeld, the double value, &c.

There are divers other words which end with gild, and these the kinds of payments, as dancergeld, wood-geld, fargeld, bordergeld, falseld, gendigeld, &c. which see.

GILD, or Guild rents, are rents payable to the crown by any
any gild, or fraternity; or such rents as formerly belonged to religious gilds, and came to the crown at the general dissolution: being ordered for sale by the flat.

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GILDABLE, or GELDABLE, denotes a person tributary, that is liable to pay tax, or tribute.

Camden, dividing Suffolk into three parts, calls the first gildable, because liable to tax; from which the two other parts were exempt, because ecclesiastic.

GILDABLE is also explained in an ancient MS. to be that land or lordship which is sol dijtritaone curie vicem.

GILDAS, in Biography, furnamed the Wulf, a British monk, and the most ancient British writer now extant, was born in the year 520. He is known among many authors by the name of Badonius, by which he is distinguished from Gildas Albianus, who is said to have lived at an earlier period. His surname Badonius is derived from a memorable victory gained by the Britons over the Saxons, at the hill of Badon, now Bath, about the time of his birth. Having been carefully educated according to the manners of the times he became monk of Bangor, where he diligently applied himself to the learning of that period, and particularly to the study of the scriptures, with a view of qualifying himself for the duties of a public preacher. He is said to have visited Ireland at the request of Americus, afterwards king of the country, where he distinguished himself by his zeal and succeds in converting Pagans, confuting the heresies of the age, establishing monasteries, and in reforming the corrupt state of principles and manners which had become prevalent among the Christians in that island. Upon his return to his native country he visited the monastery of Llan-cavan, lately founded by a pious nobleman of South Wales, and endeavoured, by all the means in his power, to engage other persons, eminent for rank and fortune, to follow his example. He spent some time in the northern parts of Britain; visited France and Italy, and then returned home, where he acquired a high reputation as a most indefatigable preacher who never hesitated to confute the prevailing vices of the age. He is supposed to have died at the abbey of Bangor in the year 590; though, according to some writers, this event happened at Glattonbury, full twenty years prior to this. The chief work of this author is; "Epitola de Excidio Britanniae, et Cafligatione Ordinis Ecclesiastic," containing lamentations over the miseries and almost total ruin of his countrymen, and very severe reproofs of the corruption and profligacy of manners in which all ranks were sharers, and of which he drew a most alarming picture. This curious remain of British ecclesiastical antiquities was first printed by Polydore Virgil in 1525, from an imperfect copy. It was afterwards published in 1568 by John Jofille, from another, and a more perfect manuscript copy, but the first edition was published by Dr. Thomas Gale, in the first volume of his "Histories Britannicae, Saxonicæ, &c." Gildas wrote several "Letters," of which there are numerous fragments in an old collection of canons preferred among the MSS. in the Cottonian library. Other pieces have been ascribed to him, but these are considered by the best judges, as not really his; among them is the "Histories de Gildis Britonum." Moreri.

GILDAS-de-Bois, St. in Geography, a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Savenay. The place contains 859, and the canton 5527 inhabitants, on a territory of 233 kilometres, in five communes.

GILDER. See GILDER.

GILDAHALLA TEUTONICORUM was used for the fraternity of Eaterling merchants in London; called also the filliard.

GILD-HALL, q. d. Gilda aula, the chief hall in the city of London. See GULD-HALL.

GILD-MERCHANT, Gilda Mercatoria, was a certain privilege, or liberty, granted to merchants, whereby they were enabled, among other things, to hold certain pleas of land within their own precincts.

King John granted gildum mercatorum to the burgesses of Nottingham.

It is held, that if the king grants to a set of men to have "gildam mercatorum," a mercantile meeting or assembly, this is alone sufficient to incorporate and establish them for ever. 10 Rep. 30. 1 Roll. Abr. 513.

GILDING, or GILDING, the art, or act, of spreading or covering certain substances with gold, either in leaf or powder, or in amalgam with quicksilver. See an account of these preparations of gold under GOLD.

The art of gilding was not unknown among the ancients, though it never arrived among them at the perfection to which the moderns have carried it. For this purpose the gold was beat into plates, with which the walls of apartments, dishes, and other vessels were covered. In early ages these plates were thick, so that this mode of gilding was very expensive. (See the proeès employed for gilding, in this manner, the horns of the ram brought by Nelfor, as an offering to Minerva, in Homer's Odyssey, l. iii. v. 492.) In procès of time, however, the expense was much lessened, because the art was discovered of making these plates thinner, and of laying them on with a fire.

Pliny affures us, that the first gilding seen at Rome was after the deftruction of Carthage, under the censorship of Lucius Mummius, when they began to gild the ceilings of their temples and palaces; the Capitol being the first place on which this enrichment was bestowed. But he adds, that luxury advanced on them so hastily, that in a little time you might see all, even private and poor persons, gild the very walls, vaults, &c. of their houses. "When we cover our houses with gold," says Senecca, (Epit. 115.) "what else do we than rejoice in deception? for we know, that coarse wood is concealed under that gold." We need not doubt but that they had the same method with us, of beating gold, and reducing it into leaves; though, it should seem, they did not carry it to the fame height; if it be true, which Pliny relates, that they only made seven hundred and fifty leaves, four fingers square, of a whole ounce. Indeed, he adds, that they could make more; that the thickest were called bratticum psalmata, on account of a flattens of the goddes Fortune at Prancelle, gilt with such leaves; and that those of the thinner fort were called bratticum gosvariae.

The modern gilders also make use of gold leaves of divers thickneses; but there are some so fine, that a thousand do not weigh above four or five drachmas. The thickest leaves are used for gilding on iron, and other metals; and the thinnest on wood. But we have another advantage above the ancients, in the manner of using and applying the gold: the secret of painting in oil, discovered of late ages, furnishes us with means of gilding works that shall endure all the injuries of time and weather, which to the ancients was impracticable. They had no way to lay the gold on bodies that would not endure the fire but with whites of eggs, or fize; neither of which will endure the water: so that they could only gild such places as were sheltered from the moisture of the weather.

The Greeks called the composition on which they applied their gilding on wood, luminum, or luminorum; which
which is described as a sort of glutinous compound earth, serving, in all probability, to make the gold thick, and bear polishing. But as to the particulars of this earth, its colour, ingredients, &c. the antiquaries and naturalists are not agreed.

There are several methods of gilding in use among us: viz. gilding on an oily size; gilding on a water size; gilding by the fire, which is peculiar to metals; gilding of books, &c.

We may distinguish, in general, two kinds of gilding, one with, and the other without, the application of heat. The first method is practised on those substances, such as wood, paper, leather, silk, lacequered and japanned ware, &c. which would be injured, and even destroyed at the temperature requisite for the other sort of gilding, which is employed on substances that are not liable to alteration by exposure to a moderate heat, such as metals, and sometimes glais and porcelain.

There are two methods of gilding on wood, viz. oil-gilding, and burnished gilding.

Gilding in oil, or an oily size, is performed by cementing the gold to the ground by means of fat oil. Linseed oil may be prepared for this purpose, by putting such a quantity of it into a broad vessel as may cover the bottom about an inch deep, and adding to it as much water as will rise fix inches or more above the bottom. Let the vessel be exposed to the sun and rain, and the contents be occasionally thredded for five or six weeks, till the oil appear of the consistence of treacle. Then separate the oil from the water, and place it in a long bottle, or separating-funnel, used by the chemists, in such heat as will render it perfectly fluid; pour off the clear part, and strain the remainder through a funnel, and the whole will be fit for use. The water helps to clear and bleach the oil, and improve it in other respects.

In order to prepare the wood for gilding, it must first be covered or primed with two or three coatings of boiled linseed oil and white lead, in order to fill up the pores, and conceal the irregularities of the surface, occasioned by the veins in the wood. If greater nicety and perfection in the work be required, the wood should be first rubbed with fife-skin, and then with Dutch ruffs.

When the priming is dry, the next operation is that of sizing the work, or laying upon it, by means of a brush, or a large pencil, a thin coat of gold size; care being taken that the brush or pencil be made to pass into all the cavities and projecting parts, if the subject be carved. This gold size is prepared by grinding calcined red ochre with a due proportion of the fat, or thickish drying oil that can be procured, (the older the better); and this size, in order to fit it for working more freely, is to be mixed, previous to its being used, with a small quantity of oil of turpentine, till it acquire a proper consistence. Sometimes the work is sized with fat oil, and the japanner's gold size (see Gold Size), ground also with ochre. If a high degree of perfection be required, the work should be sized a second time, and some add a third sizing, before the gold is laid on. In order to ascertain its fitness for this purpose, it is touched with the finger; and if it feel somewhat adhesive or clammy, or, as the gilders call it, "tacky," but not so as to be brought off by the finger, it is in a fit state for gilding. But if it be too clammy as to daub, or come off on being touched, it is not sufficiently dry; or, if it has no clammy-fe or sticking quality, it is too dry, and must be sized over again before it is gilt. When the gold size is good, it will be sufficiently dry in about twelve hours for the application of the gold. In this process, when the surface is sufficiently large and plain to contain them, the gold leaves may be laid on entire, either by means of a squirrel's tail, or immediately from the paper which originally contained them, which last method, practised by those who have acquired the necessary dexterity, is the simplest and most expeditious, as well as the best, for the perfection of the work. The leaves, being laid on the proper parts of the work, must be set to the ground, by gently compreissing those, which seem to want it, with the squirrel's tail on a cotton ball; and if any part of the gold has flown off, or has been displaced, so as to leave any spot uncovered, a piece of another leaf, of a corresponding size and figure, must be laid upon it. When the parts are too small to admit of laying on whole leaves, or when vacancies are left, after laying on whole leaves, which require to be covered with the splits or fragments of leaves, those that are to be used are turned from the paper upon a cushion. (See Gilding Cushion and Cushion.) They are then cut into slips, of a proper size, by a blunt pallate knife (see Gilding Knife); and each slip is taken up on the point of a fine brush, or by an instrument called the "tip" (see Gilding Tip), which, being moistened by breathing upon it, will take up the leaves, or any fragments of them from the cushion. When these are thus applied to the borders of the work that were to be covered, they are gently pressed down by the cotton ball, till they lie everywhere upon the ground; and the gold will immediately adhere to the fleshy surface of the size. Where the work is very hollow, and small pieces are wanted to cover parts that lie deep, they may be taken up, by the tip already mentioned, or the point of a flesh pencil, first breathed upon, and then conveyed to, and set in their proper places. The whole of the work, being thus covered, should be suffered to remain till it be dry, and it may then be brushed over by a camel's hair pencil, or soft horsehair brush, in order to clear away any loose particles of the gold leaf. If, after brushing, any defective parts appear, such parts must be again sized; and treated as before. The squirrel's tail used in gilding is cut short, and sometimes spread in the fan-fashion, by means of a piece of wood formed like a pencil-stick, but broad at both ends, and split to receive the tail; but it will equally serve in its own form, when the hair is cut to a proper length. The cotton should also be formed into a ball, by tying it up in a piece of fine linen rag; for if it be used without the rag, the fibres adhere to the gold size, and embarrass the work.

This sort of gilding is chiefly used for domes, and the roofs of churches, courts, banqueting-houses, &c. and for figures of plaster, lead, &c. that are to stand exposed to the weather.

This oil-gilding is the most simple and easy, least expensive, and most durable, as it will not be readily injured when exposed to the open air; and it may be also cleaned with a little warm water and a soft brush; but, as it cannot be burnished, it wants the high lustré which is produced by the method we shall next describe.

Gilding, Burnished, or in Dijtemper, or an Water-size, is that kind of gilding which is generally used for picture frames, mouldings, icaco, and such wooden works as are sheltered from the weather, and not subject to dampness. In order to prepare the wood for this sort of gilding, those parts that admit of it should be first well rubbed with fife-skin, and then with Dutch ruffs. It should then be carefully covered with strong size, made of shreds, &c. of white leather, such as that used by gloves, or clippings of parchmen boiled in water, in the proportion of about a pound of the
GILDING.

The shedding or clippings, to fix quarts of water, to the confidence of a jelly, and then strained through flannel while hot. When this coating is dry, eight or ten more must be applied, consisting of the fame size, mixed with fine plaster of Paris, or washed chalk, or powdered whiting; which mixture must be made by steeping the mix, and throwing the whiting, &c. gradually into it, stirring them well together, that they may be thoroughly incorporated. This is laid on with a stiff brush, and often or seldom repeated, according to the nature of the work; for pieces of sculpture, fifteen to twenty layers; for flat, or smooth works, they use ten or twelve. In the latter case they are applied by drawing the brush or pencil over the work; in the former, by dabbing it smartly on, that the size may enter all the dents of the carving.

After the last coat is laid on, and before it be quite dry, a brush pencil, dipped in water, should be passed over the whole, to smooth it, and take away any inequalities that may have been formed; and when it is dry, the parts that admit of it should be again brushed over till they are perfectly even. The work should then be repaired, by freeing all the cavities from the priming; after which a water polish should be given to the parts designed to be burnished, by rubbing them gently with a fine linen rag moistened with water.

When the whole work is become quite dry, a moderately thick layer must be applied, composed of size and bole, or yellow ochre. Dolfey, in the Handmaid to the Arts, gives the following recipe for the simplest compositions, used as the proper cement or gilding size in this kind of gilding: "Take and mix any quantity of bole argenteum, and add four times its weight of water to it, so that it may soak till it grow soft. Leave it then on the bone, but not with more water than will prevent its being of a stiff confidence, and add to it a little purified fust or tallow scraped; and grind them together. When this is wanted for use, dilute it to the confidence of cream, by parchmen or glowers' size, mixed with double its quantity of water, and made warm. Some melt the fust or tallow, and mix it previously with five or six times its weight of chalk before it is put to the bole, to facilitate their commixture, to which in this wet state they are somewhat repugnant. It is also sometimes practised to put foap fuds to the bole; which will contribute to its uniting with the tallow." (See Gold Size.) Let this composition be diluted with warm size mixed with two-thirds of water, and let it be spread with a brush over the whole of the work, and then suffer it to dry; and then let the same mixture be applied in the same manner, at least once more. After the last coat, it should be rubbed in the parts to be burnished with a soft cloth, till it be perfectly even. Some add a little vermillion to the gilding size, and others colour the whole size car-red, before it be laid on, with yellow and the glowers' fize; to which a little vermillion, or red lead, should be added. This last method is designed to give the appearance of gilding to the deeper and obscure parts of the carving, where the gold cannot, or is not thought necessary to be laid on. But this practice is much disliked; and instead of it such parts of the work are coloured after gilding; which operation is called "Matting."

The work being thus prepared should be set in a position somewhat declining from the operator; who, having at hand a cup of clean water, and some hair pencils, moistens a part of the work, and then applies the gold leaf to the part so moistened in the manner already directed under the article Oil-Gilding, till it be completely covered, or till it be too dry to take the gold. This will immediately adhere on being pressed with the cotton ball. The operator proceeds to moisten the next part of the work, and apply the gold as before, repeating the operation till the whole is completed. If, in examining the work, any parts should appear to need being repaired, they should be moistened as before, and covered with the gold; but care should be taken that no part be milled in the first operation, as it is not so easily mended as in oil-gilding: nor should any drops of water be suffered to fall on the perfect part of the gilding, as the gold is very apt to turn black in this state. The work being thus far gilt, when dry, and fit for the purpose, which it must be in about twenty-four hours, remains, either to be burnished, or matted.

The proper period for this purpose can only be ascertained by experience, and varies at different seasons. The mode of distinguishing the fitness of the work to take the burnish, is to try two or three particular parts at a distance from each other; and if these take the polish well, the whole may be concluded to be in a fit state. But if the gold peel off, or be disorder'd by the rubbing, the work must be deemed not sufficiently dry; and if the gold bear the rubbing well, and yet receives the polish slowly, it is a proof of its being too dry, which should be prevented by watching the proper time. For the work, when too dry, both requires much more labour to burnish it, and fails at last of taking to fine a polish.

To burnish it, is to smooth and polish it with a burnisher, which is usually a dog's or wolf's teeth, or a blood-stone, an agate, or a pebble, or something else very smooth, fitted in a handle for that purpose.

To mat, is to give it a light tick in the places not burnished, with a pencil dipped in size, wherein a little vermilion sometimes has been mixed. This helps to preserve it, and prevent its flaying, when handled. Or, it is to cover the hollow parts with a colour the nearest in appearance to gold.

Some recommend for this purpose red lead, with a little vermilion ground with the white of an egg; but yellow ochre, or Dutch pink, with red lead, would better answer the end; or the terra di Siena, very slightly burn't, or mixed with a little red lead, would have a much better effect, and be more durable than any other mixture so near the colour of gold in flame. Finials size will likewise supply the place of the whites of eggs. This operation of matting supersedes the necessity of yellowing, which is intended to give the appearance of gilding to the deeper and obscure parts of the carving where the gold cannot, or is thought necessary to be laid on.

The last thing is to apply a vermeil, or lacquer, in all the little lines and cavities; and to flop and anoint any little faults with shell-gold.

The composition here called vermilion is made of gum guuta, vermilion, and a little of some reddish brown colour, ground together with Venice varnish and oil of turpentine. Some gilders, in lieu of this, content themselves with fine lacco, or dragon's-blood, with gum-water.

Sometimes, instead of burnishing the gold, they burnish the ground or composition laid on last before it; and content themselves afterwards to wash the part over with size. This method is chiefly practised for the hands, face, and other nuditides in relief; which, by this means, do not appear to so very brilliant as the parts burnished; though much more so to the parts perfectly flat, or matted.

To gild a work, and yet preserve white grounds, they apply a layer of Spanish white mixed with a weak linum-glue, on all the parts of the ground whereon the yellow, or the layer next under the gold, might run.
GILDING

Gilding, japanning, is performed by means of gold powder, or imitations of it, cemented to the ground by a kind of gold size; for the method of preparing which, see Goldsize. This kind of gilding may be practiced on almost any substance whatever, whether wood, metal, leather, or paper; nor is there any preparation necessary, but this is merely the surface on which the size is to be laid, even, and perfectly clean. Then spread the japanner's size, mixed with a due proportion of oil of turpentine and varnish, with a brush over the work, if the whole surface is to be gilt; or draw with it, by means of a pencil, the proper figure desired, avoiding carefully any other parts; when it is almost dry, so as to be capable, by its clanniness, of receiving the gold, dip a piece of wash-leather wrapped round the finger in the gold powder, described under Skill-Gold, and rub it lightly over the sized work; or spread the powder with a soft camel's hair pencil; and with a camel's hair brush clear away the loose powder, after the gilded surface is dry. When leaf gold is used, the method of fixing must be the same as for the powders; but great care is necessary in laying them on, while the size is in a proper state of dryness.

There is a false kind of gilding, in which a colour of gold is given by painting and varnishes, without employing gold. Thus a very fine golden colour is given to brass and to silver, by applying on these metals a gold coloured varnish, which, being transparent, shews all the brilliancy of the metals underneath. Many ornamented brasses are varnished in this manner, which is called gold lacquering, to distinguish them from those that are really gilt. Silver leaves, thus varnished, are put upon leather, which is then called gilt leather; and many picture-frames have no other than this counterfeit gilding, which may be discovered by washing it with a little rectified spirit of wine; for the spirit will dissolve the varnish, and leave the silver leaf of its own whiteness. For plain picture frames, thick tin-foil may be used instead of silver; the tin leaf fixed on with glue is to be burnished, then polished with emery and a fine linen cloth, and afterwards with putty applied in the same manner; being then lacquered over with the varnish five or six times, it looks like burnished gold. (See Lacquering.) Among the false gildings may also be reckoned those which are made with thin leaves of copper or brasses, called Dutch leaf. In this manner are made all the kinds of what is called gilt paper. See Gilding of Paper.

Gilding of Books. There are various methods, with respect to the cement used, by which the edges of books or paper may be gilt. Strong gum-water or ingilafs size, or glover's size may be employed; but as the gum-water, and weaker sizes are apt to run beyond the edge, and thus cause the leaves to stick together, ingilafs, melted with the addition of some common proof spirit of wine, and the fifth part of honey or sugar-candy is much to be preferred; to which must be added a third of bole armeniac well powdered.

The following composition may be used for this purpose: Take bole armeniac, and sugar-candy well powdered; mix them with the whites of eggs, beaten to an oily confection; and the cement will be fit for use. In applying any of these cements, the paper, in quires or in books, should be well cut and polished on the edge to be gilt, and well burnished over by a prefs; in this state, it is to be burnished dry, or laid with a little of the cement without the sugar-candy or the bole; and when that is dry, either with the cement above given, or any other solution of gum or size with the proper proportion of the bole; after which it may be suffered to dry; and then water-polished, by rubbing it with a fine linen rag slightly moistened. It is then fit for receiving the gold, provided it be moistened at that time; and the leaves may be then laid on, being cut according to the breadth which they are to cover, and presed closely down by a cotton ball; and after the gilding is thoroughly dry and firm, it may be polished. See Book-binding, and Gilding of Paper.

Gilding on china-ware. The gold is very much valued on china-ware, and would be much more so, were it not that it is very liable to lose its luster, and to rub off. The Chinese have at present a method of preventing both these accidents, in a great measure, by means of a sort of polishing, which they give it after it is laid on. They prepare for this purpose a fine piece of agate, which they polish on one surface in as perfect a manner as possible. With this they rub over the gold, as it lies on the porcelain, several times, when it first comes from the baking. This gives the gold a lustre which it would not otherwise have, and fixes it down to the ware in such a manner, that it cannot easily be got off. The principal mishap to which gold thus laid on is subject, is the tarnishing, or growing dull; this is remedied by the same sort of means. They wet the veffel, upon which they would revive the luster of the gold, in common clean water; and while it is wet, they rub it with the same polished agate, adding a little fair water at times to keep it moist. If the gold has not been well laid on at first, this may possibly raise it or take it off in some places; but if it was originally put on with the help of this stone, as all the gold on porcelain now is, the rubbing it with it a second time never gives it any scratches, but recovers its pristine lustre and beauty. It must be observed, that the rubbing with this stone must be all done one way, both in the first laying on the gold, and in the brightening of it up afterwards. This may serve as a method for us as well as the Chinese, not only to recover the beauty of our tarnished gilt china-ware, but also to lay gold upon some of our home manufactures of this kind. Observe, fur les Coutumes de l'Afri. See Porcelain.

Gilding on enamel and glasses, is performed by burning or annealing, i. e. by producing a cohesion of the gold with the glafs or enamel, by the intermediaison of a flux, or by producing the like effect without any. In both these methods, the gold is made to adhere to the enamel or glafs, in consequence of the fusion or approach to that state, either of the flux used, or of the body of the enamel or glafs itself, by which the gold is cemented to such bodies. The flux, when any is used, may be either simple glafs of borax, or any of the preparations of fluxes powdered (see Flux); and the gold is used, either in the form of leaf gold, or in that of powder made mechanically, or by precipitation. (See Gold powder.) When leaf gold is employed without any flux, the enamel or glafs may be moistened with a very weak solution of gum arabic, and again dried. After being thus prepared, it should be breathed upon till it becomes a little adhesive or ficky, and then laid upon a sufficient number of leaves of gold: when the gold is thus united to the enamel or glafs by the cementing quality of the gum arabic, the work is ready for burning. If a flux be used, it should be finely levigated, tempered with a very weak solution of gum arabic, and very thinly spread on the part of the work to be gilded: and when the gum water is almost dry, the leaf gold should be laid on that part thus prepared for it, which is then in a state proper for burning. In the present practice, the aurum sulvianum, or precipitation of gold by alkaline farts, is made by those who use glafs in the greatest perfection; and the volatile alkal is employed for the precipitation by the chemist, who prepares it for this purpose. But when this kind of precipitate is chosen, the use of any flux must be avoided, and a very considerable degree of heat.
heat applied. The manner of using the precipitate powders of gold, the aurum fulminens excepted, as well as the leaf gold, may be varied, by adding to it or omitting any flux; but in what way forever the powder is used, it is to be tempered with the oil of spise, and worked as the coloured colours; and the quantity of flux, when any is used, may be a third of the weight of the gold. In cafes where the glass is very hard, or where the opportunity of a strong heat cannot be conveniently obtained, the expedient of using a flux in the following manner may be adopted with great advantage. Grind glasses of borax to a fine powder; and having tempered it with oil of spise, lay it on the glasses where the gilding is to be made; then burn the glasses with a degree of heat, that will cause the borax to run; and when it is cold, apply the precipitate or leaf gold, and burn it again, as in other cafes. After the work is burnt, if it be intended to be burnished, a proper Luther may be given to it, by rubbing the gilded part with a dog's tooth, or with a fine agate, or iron burnishers. Handmaid to the Arts, vol. i. p. 374, &c. See Ruby Glass.

Gold may be laid upon white earthenware or glasses, by drawing your design, upon the vessel to be gilt, with jappaners' gold fuse, moistening the fuse, as you find necessary, with oil of turpentine. Set the work in a clean place to dry for about an hour, and then place it so near the fire that you could but just bear the heat of it with your hand for a few seconds. Let it remain there till it feels quite tarry or clammy; then, having procured a cushion and some leaf-gold, cut it into slips of the proper size, and lay it on with a little cotton-wool. When the gold is all on, put the work into an oven to be baked for two or three hours.

Drinking glasses, with gilt edges, have been much admired in this country; the best of these are brought from Germany: those that are made in England, though equal in beauty to the foreign, being greatly inferior in the durability of the gilding. Dr. Lewis made several experiments with a view of discovering this art; from which he concludes, that the gold is cemented to them by means of an intervening matter, which will adhere to glasses so as not easily to be rubbed off. He tried milkfish, and other reinous bodies rubbed warm on the glasses, and several spirituous varnishes; but none of these were found to adhere sufficiently to the glasses. He recommends to the trials of the arts in this way the harder oil varnishes: and glasses have been since prepared in England, probably on the principles which he has pointed out, with as durable gilding as those brought from Bohemia and Thuringia.

M. Zeigler, in a German translation of the "Commerceum Philosophico-Technicum," describes a varnish for this purpose, with the method of using it, which appeared from his experiments to be the best. This varnish is prepared by boiling fine transparent amber; reduced to powder, in a brass vessel, to the cover of which a valve is fitted, with as much drying oil as will just cover it; and by diluting the above solution with four or five times its quantity of oil of turpentine. This varnish may be made to dry fooner, and acquires greater firmness by grinding it with a little white lead, or rather with a mixture of white lead and minium. It is to be applied very thin on the glasses, and the gold leaf laid lightly on the varnished part; when the varnish is thoroughly hardened, the gold may be burnished, by laying a piece of smooth paper between the leaf or feel burnisher, and the gold. This gilding, M. Zeigler observes, is durable, and of a fine lustre. Com. Phil. Techn. p. 65; and 674.

Gilding of figures and letters on paper, and for the embellishment of manuscripts, is performed with shell-gold, tempered with gum-water; or the characters may be drawn with a milky solution of gum-ammonium made in water, and gold-leaf applied upon them when almoft dry, or if all or any part of them is become quite dry, they may be again sufficiently moistened for receiving the gold by breathing on them. Letters raised from the surface of paper or parchment, in the manner of embossed work, such as are seen on ancient manuscripts, may be formed either by friction on a proper body with a solid piece of gold, or by leaf gold. The former method is practised by tempering pulverized crytal with strong gum-water, and with this paste forming the letters; when they are dry, they are rubbed with a piece of solid gold, as in polifhing, and the letters will appear as if gilt with burnished gold. The letters are formed with an embossed figure, either of the separate letters, or of whole words, cut in steel; and each letter of these flamps, when they are used, is anointed evenly with a feather dipped in oil. Then fill the concave letters with the above paste, and strike the flamps in a perpendicular direction on the paper or vellum, laid over some sheets of paper.

When the embossed letters are formed with leaf gold, the following, or a similar composition must be used. Thicken beaten whites of eggs with as much vermillion as is necessary to give them the confluence of paste; use the flamps as before; and when the letters are dry, moisten them by a small pencil with strong gum-water: and when this is almoft dry, cover the letters with leaf gold, preding it close to every part of them with cotton or soft leather; after the gilding is dry, polish it with proper burnishers. Com. Phil. Techn. p. 64 and Handmaid to the Arts, p. 450, &c.

Gilding of ivory-fish, as ewr-fish, cars, &c. may be performed without injuring the fish, by means of a cement; which Mr. Hooke, in his posthumous papers, directs to be prepared in the following manner: Put some Burgundy pitch into a new earthen pot, and warm the vessel till it receives so much of the pitch as will stick round it; then flame some finely powdered amber over the pitch when growing cold; add a mixture of three pounds ofinstead oil, and one of oil of turpentine: cover the vessel, and boil the contained ingredients over a gentle fire; grind the mixture as it is wanted, with so much plainsize-tome in fine powder as will reduce it to the confluence of paint. When the fish has been wiped dry, this mixture is spread upon it, and the gold leaf laid over it, and gently pressed down; after which, the fish may be immediately put into water, and the cement will harden, and be in no danger of falling off.

Gilding on leather. See Lacquering.

Gilding of metals may be done by cleaning the surface of the metal, and applying gold leaves to it, which, by means of rubbing with a polished blood-plate, and a certain degree of heat, are made to adhere perfectly well. In this manner silver leaf is fixed and burnished upon brafs, in making French plate; and sometimes also gold leaf is burnished upon copper and upon iron. For this purpose, the metal, being previously polished and quite clean, is heated to about the temperature of melted lead, and covered with a double layer of gold leaf; then a blood-plate burnisher, applied gently at first, and gradually increasing the pressure, will cause the surfaces of gold and copper to touch each other in almost every part, and then adhere with a force proportioned to the completeness of the contact. The first layer being thus burnished, a second is made to adhere in the same manner, and sometimes a third, if the gilding is intended to be very solid. This method of gilding is tedious, and is subject to the almost impossibility of using a sufficient prealure without injuring the edges of the gilded surface. In cafes where these objections do not apply, there cannot be a more effective

Gilding.
GILDING.

Gilding on Wood. See the three first articles in Gilding.

Gilding on Metals by the Fire. There are two ways of gilding by fire; viz., that with liquid gold, and that with leaf gold. For the latter, see Gilding of Metals, supra.

The former, technically called "water-gilding," is performed with gold amalgamated with mercury, in the proportion of about six or eight parts of mercury to one of gold.

In order to this operation, they heat some pure quicksilver in a clean crucible, and, when it is nearly boiling, put about a sixth of its weight of fine gold in thin plates heated red-hot, and stir them gently about, till the gold be found melted and incorporated into a mass with the mercury. It is then allowed to cool; and when cold, it is to be put in a piece of soft leather; and by gradual pressure, the fluid part of the amalgam, confining almost wholly of mercury, may be forced through the pores of the leather, while the gold, combined with about twice its weight of mercury, will remain behind, forming a yellowish filvery mass, of the confluence of soft butter.

This, after having been bruised in a mortar, or shaken in a strong phial with repeated portions of salt and water, till the water cease to be fouled by it, is fit for use, and may be kept for any length of time, without injury, in a corked phial. It is of indispensible importance that the materials of this amalgam should be perfectly pure; and therefore, the mercury employed in the preparation of it should be procured from the distillation of the red precipitate (nitrous red oxyd of mercury), either alone, or mixed with a little charcoal powder.

When silver is the metal to be gilt, it is prepared for the operation by soaking it in warm dilute muriatic acid, so that the surface may be rendered perfectly clean; it is then washed in clean water, which should be two or three times changed, in order to free it from the whole of the acid; and being afterwards dried, and made moderately warm, a little gold-amalgam, also warm, is to be evenly spread upon the silver, to which it will immediately adhere. In applying the amalgam, the operator uses a little knife, or a brush made of brafs wire, for the purpose; and giving the work a gentle heat before the fire, he dabs or spreads the amalgam with the brush farther and more evenly upon it.

Thus far advanced, the metal is set over the fire, upon a grate, or in a sort of cage, under which is a pan of charcoal, yielding a heat just sufficient for evaporating the mercury; by which means the mercury is raised in flames, and leaves the gold alone adhering to the work; in proportion as the mercury, evaporating and flying off, discovers places where gold is wanting, they take care to supply them, by adding new pieces of amalgam with the knife or brush.

If a thicker gilding be required than can result from so much of the amalgam as is applied at once, the metal, after the first quantity has left its gold fixed on the surface, has more of the amalgam spread upon it. After the evaporation of the mercury from this, another quantity may be applied in the same manner. When the mercury is evaporated, so that the surface becomes uniformly of a pale yellow colour, the metal is made to undergo other operations, by which its colour and lustre are heightened. For this purpose, it is first rubbed with a scratch brush, composed of fine brafs wire, till its surface is made clean and smooth, but the pale yellow colour still remains; then it is covered over with a composition called gilding wax, and again exposed to the fire till the wax be burnt off; and this application is repeated till the gold appears of a proper colour. This gilding wax is composed of bees' wax, mixed with the following substances; viz.

Effectual mode of gilding, as we perceive in the manufacture of gilt silver and copper wire. The bar, before it is committed to the wire-drawer, is plated with gold, by having several leaves of gold successively burnished down upon it, and then burn them into the strong compression that takes place in wire-drawing, the gold and the other metal become so perfectly united, as to form, in a manner, one substance. See Gold Hire.

Some metals, and particularly silver, may be gilt in the following manner: dip pieces of linen in the solution of gold by aqua regia, and then burn them to ashes; rub these ashes on the surface of the wire, well cleansed from any unctuous matter, with a wet linen rag, dipped in salt water, and the particles of gold contained in them will thus be applied to the wire, and adhere to it, without the application of heat, or intervention of any other body. Burnish the silver with a blood-stone, till it acquires the colour of gold. Most gilt ornaments on fans, snuff-boxes, and other toys of much flew and little value, are nothing but silver gilt in this manner. Lockmann (Hill of Inventions, vol. i.) suggests, that this method of gilding, sometimes called dry, and sometimes cold gilding, is a German invention; and that foreigners, at least the English, were first made acquainted with it about the end of the 17th century; for Robert Southewell dispenses it in the Phil. Trans. for 1698, and says, that it was known to very few goldsmiths in Germany. See Gilding of Metals by the fire.

Gilding on paper, parchment, and vellum. There are various methods used for this purpose, according to the several ends which the gilding is designed to answer. But for the most part, fire, properly so called, and gum-water, are used as the cement, and the powders are more generally employed than the leaf gold. See the three first articles in Gilding.

The gilding proper to be used with water-colours may be either with the leaf-gold or powder; the leaf-gold may be laid on the defignd ground by means of either gum-water, or ifinglass sizer; observing, that the gum-water or size be of the weaker kind, and laid sparingly on the ground, and that proper time be allowed for it to be dry; and then the gold is applied to it, as in the articles above recited; and it may be polished, if necessary, by the dog's tooth, or other kind of burnisher. In gilding larger surfaces, it will be found useful to colour the ground with the gall-flone; and when colours are to be laid on the gilding, the gall of any beast bruised over the gold will adapt it for receiving the colours. When the gold powders are used along with paintings in water-colours, they are previously formed into shell-gold.

The gilding proper for the coloured paper used in binding books, and for other such purposes, is performed much in the same manner: only that the gum-water and size may be much stronger, and that they are generally conveyed to the ground by means of a wooden plate or print, or by an engraved roller, which makes an impression of the intended figure or design. In this kind of gilding, the japoner's gold-size may be also commodiously employed; and this should be always used when the embossed appearance is wanted in the greatest degree; and for this purpose it should be thickened with yellow ochre, mixed with as much red-lead as the proper working of the print will admit. Instead of the genuine leaf-gold, or gold powder, the German powder, formed of the leaves called Dutch gold, is commonly used in this kind of gilding. The edges of books or paper are gilt in the manner directed under the article Book-binding and Gilding of books.

Gilding on Thread and Wire. See Gold-thread, and Gold-wire.
The colour of the gilding is heightened by a perfect dissipation of some mercury; remaining after the former operation. The gilt surface is then covered over with a false composition, consisting of equal quantities of nitre, sal ammoniac, green vitriol, and verdigris; finely powdered, and mixed up into a paste with water or urine; or, this is used instead of the gilding wax. The piece of metal thus covered is heated till the mixture smokes, and quenched in water or urine. This effect seems to be produced by the acid of nitre, which is diffused by the vitriolic acid of the alun, or other vitriolic salt, during the exposure to heat, acting upon any particles of copper which may happen to lie on the gilded surface. If the colour of the gilding be not sufficiently heightened by the first application, a succeeding one will complete the desired effect. Some artists think they give an additional lustre to their gilt work, by dipping it in a liquor prepared by boiling some yellow materials, as sulphur, orpiment, or turmeric. The only advantage of this operation is, that a part of the yellow matter remains in some of the hollows of the carved work, in which the gilding is apt to be more imperfect, and to which it gives a rich and solid appearance.

Copper, and the alloys formed by its combinations with zinc, are gilded much in the same manner as silver; but their affinity for mercury being considerably less than that of silver, it is not easy to produce a complete adhesion of the amalgam of gold to the burnished surface of these metals by the same means, and with the same evanesce as in the former case. Advantage is here taken of the nitric acid for facilitating the adhesion of the copper and mercury in the following manner. The piece of copper, e.g. a button, is first cleaned by steeping it in acid and subsequent washing, and it is then burnished in a lathe, or by other means; after this, it is dipped in a neutralized solution of nitrat of mercury, and in a few seconds, on account of the strong affinity of nitric acid for copper, the mercureial salt is decomposed. The copper takes the place of the mercury, and at the same time the mercury is deposited in the metallic plate, on the surface of the copper, covering it entirely, and strongly adhering to it. The gold amalgam is now applied, and the rest of the process is the same as that which has been already described. Thus a given quantity of gold may be made to cover a larger surface than in any other way of gilding on metals; five grains of gold completely gilding both the upper and under surfaces of a 144 copper buttons, each of them an inch in diameter. (Phil. Mag. ix. 20.)

Iron cannot be gilt by amalgamation, unless it be previously coated with copper, by dipping it in a solution of blue vitriol, or rubbed with the vitriol itself a little moistened. Iron may also receive a golden coat from a saturated solution of gold in aqua regia, mixed with spirit of wine; because the iron, having a greater affinity for the acid, precipitates the gold from it.

In the gilding of iron, or rather steel, by means of an amalgam, peculiar difficulties occur. If recourse be had to the method of simple burnishing down, the heat requisite for this purpose will, in many cases, bring the temper of the steel too low; on such occasions the mode already described of gilding copper is sometimes practiced: that is, the parts of the steel to be gilded are precipitated with nitrat of mercury by which they are covered with a slightly adhering coating of mercury; then the amalgam is applied, and the gilding is finished in the usual way. The objections to this process are, first, that a considerable heat is required, though inferior to that requisite for burnishing down; and, secondly, that, even with all possible care, the gilding is apt to be rough and to scale off.

A very considerable improvement on this method is to trace the figure of the gilding on the steel first of all with a brush charged with a strong solution of sulphated copper, in consequence of which a pretty thick plate of this metal is deposited on the steel to which it may be made to adhere with considerable firmness by means of the burnisher; thus the gilding is, in part, performed upon the copper.

A new method of gold gilding upon steel has lately been published (see Phil. Mag. xi. p. 144), possessing many advantages over the others, and capable of ultimately attaining a very high degree of perfection. This method depends upon the well-known fact, that if sulphuric ether and nitro-muriat of gold are mixed together, the ether will, by degrees, separate from the acid nearly the whole of the gold, and retain it for some time in solution in nearly a metallic state. If ether, thus charged with gold, is spread, by means of a pen or fine brush, on the surface of highly polished steel, the ether presently evaporates, leaving the gold behind in close contact with the steel, and the adhesion is considerably improved by the subsequent application of the burnisher. The deaerated, and especially the rapid volatility of ether, are objections; but may be obviated by using a spirit oil of turpentine instead of the ether, which has nearly the same efficacy in decomposing the nitro-muriat of gold, and is both cheaper, and not so very quickly evaporable.

On the subject of gilding by amalgamation, Dr. Lewis has the following remarks: "There are two principal inconveniences in this business; one, that the workmen are exposed to the fumes of the mercury, and generally, fomer or later, have their health greatly impaired by them; the other, the loss of the mercury; for though part of it is laid to be detained in the cavities made in the chimney for that purpose, yet the greatest part of it is lost. From some trials I have made, it appeared that both these inconveniences, particularly the first and most considerable one, might be in a good measure avoided, by means of a furnace of a due construction."

If the communication of a furnace with its chimney, instead of being over the fire, is made under the grate, the alispit door, or other apertures beneath the grate, closed, and the mouth of the furnace left open, the current of air, which otherwise would have entered beneath the surface of the water, passing through the grate to the chimney, carries with it completely both the vapour of the fuel, and the fumes of such matters as are placed upon it. The back part of the furnace should be raised a little higher above the fire than the fore-part, and an iron plate laid over it, that the air may enter only at the front, where the workman stands, who will be thus effectually secured from the fumes, and from being incommoded by the heat, and at the same time have full liberty of introducing, inspecting, and removing the work.

If such a furnace is made of strong forged (not milled) iron plate, it will be sufficiently durable. The upper end of the chimney may reach above a foot and a half higher than the level of the fire; over this is to be placed a larger tube, leaving an interval of an inch, or more, all round between it and the chimney, and reaching to the height of ten or twelve feet; the higher the better. The external air, passing up between the chimney and the outer pipe, prevents the latter from being much heated, so that the mercurial fumes will condense against its sides and not over-burn the chimney, which falling down to the bottom, is there caught in a hollow rim, formed by turning inwards a portion of the lower part, and conveyed by a pipe at one side into a proper receiver.

Another method is mentioned by authors of gilding upon metals, and also upon earthen-ware and glasses; which is, to fuse gold with regulus of antimony, to pulverize this mass,
and spread the powder upon the piece to be gilt; afterwards, to expose it to such a fire that the regular is evaporated while the gold remains fixed. But Dr. Lewis mentions the following incompatibilities to which this method is subject: the powder does not adhere to the piece, and cannot be equally spread; part of the gold is disintegrated along with the regular; glass is incandescent. For the evaporation of regulars of antimony; and copper is liable to be corroded by the regular, and to have its surface rendered uneven. Lewis’s Com. Phil. Techn. p. 77, &c. p. 81, 88. and 186. Macquart’s Dict. Chem. Eng. ed. 1777; and Aikin’s Dict. of Chemistry, art. Gilding.

Gilding: Cofîtes, is formed by a few folds of flannel, or a quantity of tow or wool, secured in a piece of wood of any size from eight to fourteen inches square by a light covering of leather, and fastened tight round the edges. The surface should be perfectly flat and even, and it is usually furnished with a handle. See Cushion.

Gilding Knife, a slip of the hollow Spanish cane, cut up to a smooth and sharp edge, with a good penknife; this cane knife cuts the gold leaf better than one of steel, as it is apt to stick to this hall. This knife may in all respects be the same as those used in painting, called “pallet knives”; the blade of which may be of six or six inches long, and somewhat more than half an inch in breadth, with a proportionable handle.

Gilding Pallet, a flat piece of wood, about three inches long, and an inch broad, covered with a piece of fine woollen cloth. By breathing upon this pallet, to moisten the cloth a little, and then clapping it gently down upon the gold leaf, this may be raised from the cushion, and conveyed to the work to be gilded.

Gilding Tjg., a tool made by fastening the long hairs of a squirrel’s tail between two cards, and used for taking up the gold leaf after it is cut, and applying it to the artie to be gilded.

Gilding Wax. See Gilding of Metals.

GILD, in Biography, a powerful lord in Mauritania, served the emperor Theodosius, in his brother’s revolt in 373, with so much fidelity, that he was raised to the chief command in Africa. During the reigns of Arcadius and Honorius he maintained a kind of independence, and ruled, at his pleasure, the provinces under his command, which he oppressed by every species of tyranny. In the divisions between the eastern and western empires, he was perfidious by the minster Eutropius to acknowledge Aecadius: for this he was condemned as a public enemy by the Roman senate. About the same time a deadly quarrel had arisen between Gildo and his younger brother Maesezel, in which the latter had taken refuge in the court of Honorius. Gildo, with a brutality that can never be sufficiently execrated, satisfied his disappointed vengeance upon the two children of his brother, whom he barbarously murdered. Maesezel, anxious for revenge, landed a body of troops in Africa, and encamped in the face of a numerous army of Moors collected by Gildo. Thrice, intimidated by the superior discipline of the Europeans, fled almost without a blow. Gildo escaped to the sea-shore, where he embarked for a foreign country, but, being driven back by adverse winds, he was seized by the inhabitants and thrown into a dungeon. There a voluntary death fared him from the cruel fate, which his conscience told him he might expect from his injured brother. The revolt of Gildo, says the historian, was considered as an event of so much importance to the empire, that the poet Claudian made the “Gildonic war” the subject of one of his pieces, to the honour of stilicho, who was the commander in it, against the subject of this article. Gibbon. Univ. Hist.

GILEAD, Balm. See JALSAM.

GILEAD, Bath. Balm of. See Dracoothphalam.

GILEAD, in Scripture Geography, mountains of Palestine, which lay E. of Jordan, and separated the lands of Ammon, Moab, Reuben, Gad, and Manasseh from Arabia Deserta. According to Esdras, Mount Gilad reached from Libanus northward to the kingdom of the Amorites, which was ceded to the tribe of Reuben; so that it must have extended above 70 leagues from north to south. This mountain, or rather chain of hills, was much celebrated for its excellent balm. Jer. vii. 22, xxvi. 11. &c. 8. Gen. xxxvi. 25. See Balsam.

Gilead derived its name from Giel-laad, 6. d. the heap of witnesses, in reference to the heap of stones raised as a monument of the covenant between Jacob and Laban. Gen. xxxi. 21.

GILES, in Biography, a learned Italian prelate, and cardinal of the sixteenth century, distinguished himself by the procris which he made in different branches of literature; and was appointed professor of philosophy, and then of theology, in his order, that of the hermits of Augsburg. In 1507, he was raised to the post of general of his order, and was employed by pope Julius II. to open the council assembled at the Lateran in the year 1512; and, in 1517, was sent legate into Germany by Leo X., on which occasion he was promoted to the office of cardinal. After this he was sent into Spain, and employed in many difficult negotiations. He was nominated bishop of several important sees at different periods, and also patriarch of Constantinople. He died at Rome in 1532, and left behind him a very high character for learning. He was, during his life, perpetually consulted in difficulties that occurred to the literati in the Oriental as well as the Latin and Greek languages. He was the author of many works that bear testimony to his reputation, among these are, Remarks on the early Chapters of the Book of Genesis, Commentaries on some of the Psalms of David; Dialogues, Epistles, Poems, &c. In the third volume of “Amphitrite Collectio veterum monumentorum,” many letters of this prelate and his correspondents are inserted, which contain numerous facts as well relating to his own history, as to that of the period in which he flourished. Moreri.

GILFORD, in Geography, a small port and market town of the county of Dublin, Ireland. The river Barrow runs through the centre of it, over which there is a very handsome bridge, highly ornamented with hewn stones, of twenty-two arches. It is a handsome neat town, and the country about it is highly improved; the houses are good, and chiefly inhabited by wealthy and reputable linen-drapers. The linen trade is carried on very extensively here, and the cloth is as remarkable for the fineness of its texture, as the river is for giving it an excellent bleach. Nothing can exceed in beauty the vale from Banbridge to Moyallen through Gilford, on the borders of the Barrow, for a continuance of six miles; the river in delightful meanders, the rising grounds surrounding it adorned with woods, and the bottoms variegated with bleach-greens, afford views the most beautiful and picturesque. Gilford is 62½ miles N. from Dublin, and 11 miles from Armagh.

GILGAL, in Scripture Geography, a celebrated place, W. of Jordan, where the Israelites encamped after their passage of this river, and where a considerable city, famous for many events, was afterwards built. It was about a league from Jordan and from Jericho.

GILGE, in Geography, a town of Prussia, in the circle of Sand...
G I L

Samland; 28 miles N.W. of Königsberg. — Also, a river of Prussia, which branches off from the Memel about 8 miles below Pillit, and runs into the Curische Haff, N. lat. 55° 10', E. long. 21° 24'.

GILGEN, St. a town of Austria, 10 miles N.W. of Efferding. — Also, a town of Sticla; 5 miles N.N.E. of Marburg.

GILGENAU, a town of Prussia, in Oberland; 15 miles N.N.W. of Soldau.

GILGENBURG, a town of Prussia, in Oberland; 60 miles E. of Culm. N. lat. 53° 17', E. long. 19° 57'.

GIGUL HAMMETHIN, a Hebrew phrase, literally signifying the rolling of the dead. To conceive the use of this expression it is to be observed, that the Jews have a tradition that, at the coming of the Messiah, no Israelite shall ride anywhere but in the Holy Land. What, then, shall become of all the faithful interred in other parts? Shall they perish, and remain in the state of death?

No, say the Jewish doctors; but God will dig them subterraneous canals, or cavities, through which they shall roll from their tombs to the Holy Land; and, when they are arrived there, God will blow on them, and raise them again.

This imaginary passage of the carcases, or ashes, of the Jews from their tombs to the Holy Land, by rolling underground, is what they call gigul hammethin, the rolling of the dead.

GILBERTIA, in Betony, named by Prof. Gmelin of Gottingen in his faulty edition of the Syll. Nat. of Linneaus, v. 2. 682, in honour of John Emanuel Gilbert, author of a Flora Lithunicana, printed in 1781, octavo, which was suppressed by authority of the government of Poland, on account of its alleged imperfections, but which was reprinted by its author afterwards at Lyons, where he also edited various works of Linneaus—Wild. Sp. Pl. v. 2. 531. (Quivilia; Cavan. Diff. 367. Juss. 264. Lamarck. Fl. t. 302.)—Clats and order, Decandria Monogynia. Nat. Ord. Tribulata, Linna. Melle, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, bell-shaped, with four or five teeth, permanent. Cor. Petals four or five, ovate, obtuse. Nectary of one leaf, cup-shaped, shorter than the petals, embracing the germen, with ten marginal teeth. Stem. Filaments none; anthers eight or ten, ovate, erect, fleshy on the teeth of the nectary. Pist. Germen superior, globose, furrowed, shorter than the nectary; style simple, rising above the nectary; stigma globose, thick, furrowed. Peric. Capsule ovate, coriaceous, splitting half way down into four acute recurved valves, with longitudinal central partitions, separating it into four cells. Seeds one or two in each cell, ovate, smooth, affixed to the columella.

Eff. Ch. Calyx with four or five teeth. Petals four or five. Nectary cup-shaped, bearing the anthers on its margin. Capsule ovate, of four seeds. Seeds mostly follicled.

1. G. decandra. (Quivilia decandra; Cav. n. 531. t. 211.) — Leaves alternate, elliptic-lanceolate, undivided. Flowers five-cleft, decandrous, racemose. — Gathered by Commeron in the islands of Mauritius. An evergreen shrub, with numerous, alternate, zig-zag branches. Flowers alternate, flatly expanded, an inch or inch and half long, elliptic-lanceolate, entire, more or less acute, smooth, with one rib and many transverse veins, without stipulas. Flowers from five to nine in each axillary cluster, with downy flacks and calyx. Petals white, elliptical, thrice as long as the calyx, silky at the back, each about a quarter of an inch in length. Nectary white, about half as long. The habit of the shrub and aspect of the flowers, resemble a Limonia.

2. G. heterophylla. (Quivilia ovata; Cav. n. 532. t. 212; and Qu. heterophylla; n. 533 t. 213.) — Leaves ovate, undivided, fimbriated, or pinnatifid. Flowers four-cleft, oxtandrous, somewhat umbellate. — Gathered by Commeron in the islands of Bourbon and Mauritius. The leaves are rather smaller than in the last, and remarkable for their variety of shapes, being either ovate and blunt, or somewhat pointed, or either undivided, or more or less slightly waved or fimbriated, or deeply and accurately pinnatifid like an oak-leaf; all these varieties are found on the same specimen, nor can we separate Quivilia ovata, though all the leaves of one plant happened to be undivided, for the original specimens accord in every other particular. The flowers are much smaller than in the first species, and grow from two to four together in rather an umbel, than a cluster. Capule the size of a pea, pointed, slightly filty.

3. G. oppolifolia. (Quivilia oppolifolia; Cav. n. 534. t. 214.) — Leaves opposite, elliptical, undivided. Flowers somewhat umbellate. — Native of the Mauritius. Leaves broadly elliptical, obtuse, uniform, two inches long, all nearly opposite, as well as the branches. We have not seen the flowers. The fruit is rather umbellate than racemose. The size of a large pea, furrowed, depressed, clothed with shining tawny down, and opening into four or five parts on the same branch.

4. G. ruifolius. — Leaves alternate, ovate, pointed, undivided. Flowers somewhat racemose. — Gathered by Commeron in the Mauritius with the former, but not described by Cavanilles or Willdenow. The leaves are almost as large as the leaf, but more pointed, often oblique, and always alternate. Branches zig-zag. Clusters short, racemose, though appearing like little umbels, about the length of the footstalks, each of from three to five flowers, their flasks very slightly downy Petals filky at the back, a line long. Fruit of four cells, globose, four-furrowed, the size of a pea, clothed with short, dense, rigid, golden-coloured pubescence.

Commeron, the only botanist who has gathered any species of this genus, seems to have intended naming the decandrous ones Baretia, and the oxtandrous Ahabella, but they cannot be separated on any botanical principle whatever. All go by the name of Reade Queir among the French in the islands of Mauritius and Bourbon, whom Cavanilles contrived his barbarous name Quivilia. Of their qualities or uses nothing is mentioned. The names of Baretia and Ahabella were both intended to commemorate a young woman, who, being desirous of failing round the world, put on men's cloaths, and engaged herself as a sailor, her real sex being concealed from all on board, except Commeron, to whom she devoted herself, passing as his servant. At length, on the arrival of the ship at Otaheite, the more intelligent natives discovered the secret which had escaped the penetration of her companions, to their no small advantiment. Commeron contrived the word longifolia as a specific name, to express her fidelity. The Otaheitians, had they understood Latin, would probably have invented a better.

GILMER, or GILMUR, in Biography, is the last king of the Vandals in Africa, a descendant of Generic, succeeded to the throne of his depoted cousin Hilderic. The emperor Julianus acknowledged the cause of the dethroned soveraign, and determined for him the African provinces to the more to the Roman dominion. Belisarius was chosen to execute the design, who failed in 533. Zeno, the brother of Gilmer, was, at this time, engaged in the conquest of Sardinia, by which circumstance the force of the Vandals was divided, while a considerable party at home still adhered to the late king Hilderic. Gilmer assembled his troops to resist the invader, but being defeated with great slaughter he was glad to resign his crown to his brother, Zeno, and submit to the Romans.
fired to the Numidian deferts, having first exercised the tyrant's policy, by commanding the execution of Hilderic and his captive friends. Carthage submitted to the victorious Belfarius; but Gilius collected his scattered forces, and being joined by Zano, who had returned from Sardinia, a second action ensued, in which Zano lost his life, and Gilius again retreated. The loss of the African provinces succeeded, and the defeated king was forced to take refuge in the inaccessible mountains of the interior of Numidia. Even here, he was surrounded by a part of the Roman army under Pharus, and reduced to the utmost distress, which to him was peculiarly afflictive by its contrast with the luxury and effeminacy in which he had been accustomed to live. So detestable was his situation, that he is reported to have applied to Pharus for a lye, a sponge, and a loaf of bread; the first he said was to sooth his froward; the second to dry up his tears; the third he asked as an humble delicacy, of which he had not tasted for a long time. His diffidences at length obliged him to submit to the conqueror; he descended from the mountains, and followed Belfarius to Coisantinople, marching in the train of his triumph; on which occasion, he suffered neither tear nor sigh to escape, but frequently exclaimed, in the language of Solomon, "Vanity of vanities, all is vanity!" The emperor received him with respect, and dowered him with attention and kindness; he would have raised the fallen monarch to the dignity of patrician, could he have been persuaded to renounce the Asin doctrine, in which he had been educated. He was put in possession of a large estate in Gaetia, where, in the bosom of his family, he ended his days in peace. The extinction of the Vandal kingdom in the person of Gilius is to be dated from the year 554. Gibbon, Univer. Hist.

GILION, in Geography, an island in the East-Indian seas, about 36 miles in circumference. S. lat. 7° 6'. E. long. 114° 37'.

GILS, Sr., a town of France, in the department of the Seine, and chief place of a canton, in the district of Termonde. The place contains 3228, and the canton 16,770 inhabitants, on a territory of 95 kilometres, in six communes.

GILZTAIN, a town of the duchy of Carinthia; 10 miles E.N.E. of St. Veit.

GILL, in Agriculture, a term sometimes applied provincially to the pair of wheels and frame on which timber is conveyed.

GILL, John, in Biography, was born at Kettering, in Northamptonshire, in 1657, and devoiing, when very young, an uncommon capacity for learning, his father, who was a deister of the Baptist persuasion, sent him to a grammar-school in the neighbourhood, where he soon outstripped his companions in classical attainments. When he was but eleven years of age he had read several of the common school books in Latin, and made a considerable proficiency in the Greek. Owing to the more correct circumstances of his parents he was put to business, but he did not fail to improve his leisure moments by an attention to classical literature, so that by the time when he had attained his sixteenth year he had read all the Greek and Latin authors that had fallen in his way, and had diligently studied logic, rhetoric, moral and natural philosophy. He had likewise studied Hebrew so as to be able to read the Old Testament in the original with pleasure. In 1716 he was baptized, and soon after commenced preaching in private. He now removed to Hitcham Ferrers to prosecute a regular course of studies under Mr. Davis, a man of considerable learning, and pastor of a Baptist church in that place. His stay here was short, and after about a year he returned to his native town, and became assistant preacher to the congregation there; and in 1719 he received and accepted an invitation to become pastor of a Baptist congregation in Southwark. The duties of this situation he discharged with great fidelity and usefulness more than half a century. He died in 1771 in the seventy-fourth year of his age. His sentiments in religion were strictly Calvinistic; and his moral conduct was unimpeachable and truly exemplary. He was author of many works, particularly of "An Exposition of the Old and New Testament;" in nine volumes folio: "A body of Divinity," in three volumes 4to.; "A Supplement to Mr. Whiston's Essay towards restoring the true text of the Old Testament." In the year 1748, when he had published the third volume of his "Exposition of the New Testament," the degree of doctor of divinity was conferred upon him by the university of Aberdeen without his solicitation or knowledge; information of the fact was communicated to him by two of the learned professors, who declared that his diploma was presented to him, "on account of his great knowledge of the scriptures, of the oriental languages, and of Jewish antiquities, of his learned defence of the scriptures against Deists and infidels, and the reputation gained by his other works." Dr. Gill had, indeed, from the time of his settling in the metropolis, paid a most unwearied attention to the oriental languages; he had studied the writings of the fathers, ecclesiastical history, the accounts of the rites and customs of the eastern nations, all which he knew were adapted to enrich his stores of biblical learning, and to qualify him for the duties of his profession. Gen. Biog.

GILL, in Botany. See GLECHOMA.

GILL, in Geography, a township of America, in the state of Massachusetts and county of Hampshire, situated on the north bank of Connecticut river, 90 miles from Boston; containing 700 inhabitants.

GILL, or RAIK, is a name in several English counties for a brook, rivulet, or small stream of water.

GILL, a measure of ale or beer, is 1/4th of an ale pint = 8.9352 cubic English inches = 1.220779 wine gills = .0160624 cubic links.

GILL of wine, cider, oil, &c. = 1/4th of a wine pint = 7.21875 cubic English inches = .8191490 ale gills = .0145367 cubic links.

GILL, Scotch measure, = 1/4th of a maltshilling = 1/16th of a Scotch pint, the cubic content of which varies much in different places. See Scotch Pint.

GILLAROO, TROTL. See TROUT.

GILLIEN'S BAY, in Geography, a bay on the S. coast of the island of St. Christopher; two miles W. of Baffet-terre.

GILLE-LA VICOMTE, Sr., a town of France, in the department of the North Coast; six miles N.W. of Clermont.

GILLES-LES-BOUCHERIES, Sr., a town of France, in the department of the Gard, and chief place of a canton, in the district of Nimes; 12 miles S.E. of Nimes. The place contains 5356, and the canton 6577 inhabitants, on a territory of 180 kilometres, in two communes.

GILLES-SUR-VIC, Sr., a town of France, in the department of the Vienne, and chief place of a canton, in the district of Les Sables-d'Olonne; 13 miles N.N.W. of this latter town. The place contains 760, and the canton 12,535 inhabitants, on a territory of 4321 kilometres, in 17 communes.

GILLES, Peter, in Biography, was born at Albi in 1490, and became distinguished as a scholar and traveller. Having acquired an extensive knowledge of the learned languages...
GILLS, Lofi of the. See Folium branchiocranum.

GILLY-FLOWER, in Gardening, the common name of a fine fragrant flowery plant, common in gardens, &c. See DIANTHUS.

GILLY-FLOWER, Queen's. See HIPPEASTRUM.

GILLY-FLOWER, Stock. See CHEIRANTHUS.

GILLY-LOUGH, in Geography, a lake of Ireland, in the county of Sligo; and on the river by which its waters are discharged into the sea stands the town of Sligo. This lake exhibits a variety of charming prospects which bold hills, wooded lawns and large islands clothed with verdure and crowned with trees, united with a great extent of water, cannot fail to produce. Beaumont.

GILMANTOWN, a post-town of America, in Strafford county, New Hampshire, S.W. of lake Winnipigosee, and 52 miles N.W. of Portsmouth; incorporated in 1727, and containing 3752 inhabitants.

GILMARQUEY, a town of Hindooistan, in Douttabad; 13 miles N.E. of Nander.

GILOH, or GELO, in Scripture Geography, a town of Palestine, situated in the mountains of the tribe of Judah. John xi. 51.

GILIOLO, in Geography, one of the Moluccas islands, in the East-Indian ocean, of considerable extent, and in its rugged form resembling a large loaf of bread. Its length is about 250 British miles, and the breadth of each limb fathom above 40. The shores are low; but the interior rises to high peaks, perhaps of granite. This island is said to have been once governed by one sovereign, a chief from Mecca; but the fultans of Ternate and Tidore now seem to share in between them, the former poising the northern part with Mortay, Bakian, Motir, and some Celebesian islands, and part of Papua; while the fultan of Tidore holds the southern part with Myof, and some other isles. One of the chief towns is Tatamay, situated on a point or promontory of the eastern limb, faced with precipices, so as to be accessible only by ladders. Giglio abound with oxen, buffaloes, goats, deer, and wild hogs; but the sheep are few. The bread-fruit and fago-tree are common; and, in spite of the Dutch extermination, there are probably cloves and nutmegs. The natives are industrious, particularly in weaving; but their exertions are suppressed by Batavian jealousy. The equinocital rivers through the southern part of the island. E. long. 128°.

GILLOCH, in Argyleshire, Scotland, is a kind of gulf branching from Loch Fyne on its W. side, which is navigable for vessels to the entrance of the Crinan canal, through which they pass to Loch Crinan, and the Irvine frae. See CANAL.

GILPIN, BERNARD, in Biography, was born at Kentmire, in Westmorland, in the year 1517. He was defined by his parents for the church, and educated with that view. At sixteen years of age he was entered at Queen's college, Oxford, where he became distinguished for the diligence with which he applied to his academical studies. He was led to think for himself, and freely, by the writings of Erasmus; and as he determined to apply himself to the study of theology, he set about acquiring a thorough knowledge of the Greek and Hebrew languages, in order that he might investigate the scriptures in their original tongues. In 1539 he took his degree of B.A., and in 1541 that of M.A., and about the same time he was elected fellow of his college, and admitted into holy orders. Shortly after he was invited to become a member of cardinal Wolsey's new foundation at Chirll-church, which he accepted. Here he continued his former studies, but it does not appear that his course of reading had produced any doubts in his mind respecting the

GILORSI, an island on the coast of West Florida, divided from Dauphin island by a very narrow channel, through which a boat cannot pass without some difficulty; and between Gillori and the main land, on the west side of Mobile bay, there is a chain of small islands and oyster shells, through which is a passage of four feet, called 'Passe au Heron.'

GILLS, BRANCHLE, in Medical Science. See Fish, Organ of Respiration.
the popular religion, for he even entered into a vindication of the Catholic doctrines in a dispute with Hooper, afterwards bishop of Winchester. The dispute was however favourable to his improvement and candour, as it afforded him the opportunity of discovering that his own opinions were not so well supported by scripture as he imagined. Upon the accession of Edward VI., Peter Martyr was sent, under the patronage of that prince, to Oxford to read divinity lectures, a duty which he performed in a strain to which that university had been but little accustomed. He attacked many established doctrines, which had been long regarded as the truth, and the only truth. Gilpin was looked up to, as capable of defending the established doctrines in opposition to modern innovations, but his faith was shaken, and he chose to remain an unprejudiced spectator, ready to embrace whatever should appear the truth, after deliberately weighing the arguments which the discussion might produce. At length, however, he contented to enter the lists with Peter, and the dispute ended in the conviction of Gilpin that there were great corruptions in popery, and that there was need of a total reformation. He continued at Oxford till he was thirty-five, and took his bachelor's degree in divinity. In 1552 he was presented with a living in Durham, but before he went to reside there, he was appointed to preach before his majesty at Greenwich. The king was not present, but Gilpin's discourse was a serious and very hostile attack on the prevailing avarice and corruption of the age; he spared neither the court, clergy, magistrates, nor gentry. The freedom which he made use of at this time recommended him to the notice of many persons of the first rank, particularly of Sir William Cecil, afterwards lord Burleigh, who obtained for him a general licence for preaching. While Mr. Gilpin was in London, he frequently visited his uncle Tonitall, bishop of Durham, at that time a prisoner in the Tower, under a sentence of imprisonment for treason. When Mr. Gilpin was settled in the country, he felt many doubts how to proceed in the instruction of his people; he had not made up his own mind on many important doctrines, and therefore felt but ill qualified to teach others, or indeed to guard them from the prevailing errors. He accordingly resigned his living, and determined, at the advice of Tonitall, to spend some time abroad. He had now an opportunity of re-examining all his opinions; he began to have just notions of the doctrines of the reformed; few things in a clearer light, and felt a satisfaction in the change that he had made, to which he had hitherto been a stranger. On the death of king Edward, Tonitall was released and reinstated in his bishopric; he immediately offered his nephew a good living, which was respectfully refused on conscientious principles. He returned from the continent in the year 1556, and immediately visited bishop Tonitall, who received him with great friendship, and presented him with the archdeaconry of Durham, to which he annexed the living of Earlington. He now repaired to his parish, determined to do what good he was able in improving vice, and encouraging virtue. His zeal and fidelity in the good work of reformation made him many enemies, and the cry of heresy was continually founded against him, but by the skilful management of his uncle, the charge, though formally and publicly brought, was disdained. After this, he resigned his preferment in the church, and became domestic chaplain to the bishop. Mr. Gilpin did not remain long without a benefice, but was inducted to the living of Houghton-le-Spaw, and upon his arrival at the place, people crowded to him from all quarters, perceiving that he was a teacher very different from those to whom they had been accustomed, and by his truly affectionate treatment of them, he quickly gained their confidence, respect, and attachment. The bishop was still anxious for the advancement of his nephew, and presented to him a vacant prebend in the cathedral of Durham, which Mr. Gilpin modestly, but firmly declined, and told the prelate, "that by his bounty he had already more wealth than, he was afraid, he could give a good account of, and he hoped his lordship would rather bestow this prebend on one by whom it was more wanted." A fresh set of articles of impeachment were drawn up and presented against him, and he was again protected by his uncle, but from this period the bishop's favour to him manifestly declined, and he struck him out of his will. He was exceedingly concerned to have in any way offended so good a benefactor, but he could not compromise the matter; he was bound to satisfy his conscience, and Tonitall was vexed that he should carry his piety and zeal to what he thought an excess. The notice of Mr. Gilpin's enemies was not satisfied with the loss which he had experienced in his uncle's eleemosyne; they accused him before the savage Bonner, who, in the moment of his frantic zeal, declared that he would bring him to the stake in a fortnight. Gilpin refused to listen to the entreaties and intercessions of his friends by leaving the country, but was prepared to suffer for the truth, as he had been zealous in propagating it. He accordingly waited with great composure for the arrival of the bishop's messengers. He was apprehended, but fortunately, before he could reach London, an account of the Queen's death met them on the road, an event not more favourable to our worthy pastor, than important for the country at large. The meretricious ravage might now gastrify his teeth, but he could no longer inflict the venom of his malignity upon the unoffending reformers. Gilpin, thus almost miraculously delivered, returned to Houghton through crowds of people, who regarded him as a father, and who expressed their utmost joy, and offered up their thanks to Almighty God for his deliverance. Mr. Gilpin was soon nominated to the bishopric of Carlisle, which he declined, giving as a reason, that in this diocese he had many friends and acquaintance, of whom he did not think very highly, and that he must compound at many irregularities, or draw upon himself so much hatred as to prevent his usefulness. In 1561 he was offered the provostship of Queen's college, Oxford, which he like-wise declined; contenting himself with the living of Houghton, the duties of which he performed in the most exemplary manner. He employed much of his time in endeavouring to improve the minds of the younger part of his parish, suffering none to grow up in an ignorance of their duty, but urging all to intermix religion with labour, and amidst the cares of this life, to have a constant regard to the next. He was assiduous in preventing lawsuits among his parishioners, and his bail was frequently thronged with people of his own or neighbouring parishes, who came to settle their differences. He had a tender concern for all under affliction, and was a much readier vizient at the house of mourning than at the house of feasting. To strangers and travellers there was always a generous welcome at the house of Mr. Gilpin, and he could suit himself to persons of all ranks in life. Once he received an unexpected visit from lord Burleigh, and the reception of the noble stranger was so liberal, that his lordship was accustomed to say, that he could not have expected more at Lambeth. When the great statesman left his host, and had travelled about a mile from his residence, he turned his horse to take one more view of the place in which he had experienced so much content, and having kept his eye fixed some time, he exclaimed, "This is the enjoyment of life, indeed! Who can blame that man for not accepting a bishopric! What does he want, or what can he possess to make him greater or
or happier, or more useful to mankind." Mr. Gilpin's labours extended beyond his own parish; he every year visited divers neglected parishes in Northumberland, Yorkshire, Cheshire, Welfordmore, and Cumberland; and that his own flock might not suffer, he was at the expense of a constant assistant. In all his journeys he did not fail to visit the gaols and places of confinement; and by his labours and affectionate manner of behaviour, he is said to have reformed many abandoned persons in those abodes of human misery. He had set places and times for preaching in the different parts of the country, which were as regularly attended as the alms houses towns of a circuit. If he came to a place in which there was a church, he made use of it; if not, of barns, or any other large building, where great crowds of persons were sure to attend him, some for his instructions, more, perhaps, to partake of his bounty; but in his discourses he had a sort of enthusiastic warmth, which caused many to a sense of religion who had never thought of anything serious before. The dangers and fatigues attending this employment were, in his estimation, amply compensated by the advantages which he hoped would accrue from them to his un instructed fellow-creatures. He did not spare the rich; and in a discourse before the bishop of Durham, who had already conceived a prejudice against him, he spoke with so much freedom, that his bel friends dreaded the result; they solicited him for giving the prelate a handle against him, to which he replied, "If the discourse should do the good he intended it by, he was regardless of the consequences to himself." He then waited on the prelate, who said, "Sir, I propose to wait upon you home myself." When they arrived at the rectory, and entered the house, the bishop turned suddenly round, and grasped him eagerly by the hand, saying, "Father Gilpin, I know you are litter to be bishop of Durham, than I am to be patron of this church of yours. I ask forgiveness for past injuries. Forgive me, father, I know you have enemies, but while I live bishop of Durham, none of them shall cause you any further trouble." Upon queen Elizabeth's recommending the establishment of free-schools, Mr. Gilpin undertook to build and endow one, a design which he immediately put in execution. This school was no sooner opened than it began to flourish; and there was so great a report of young people to it, that in a little time the town was scarcely able to accommodate them. He procured able masters from Oxford, and took every method to encourage those of his pupils who were most diligent in their studies. In the latter part of his life Mr. Gilpin went through his various duties with much difficulty; his health was impaired, and his constitution broken down by the great fatigue which he had undergone for many years. In addition to his infirmities, he met with an accident which had nearly proved fatal to him, and from the effects of which he never perfectly recovered. As he was crossing the market-place at Durham, he was thrown down, and almost trampled to death by an ox. After a long and tedious remission, he was able to get out of bed, and lived as long as he lived. He died in 1783, in the 66th year of his age. Such were the life and labours of Bernard Gilpin, who, for his exemplary piety, laborious virtue, and unbounded benevolence, deserves to have his name transmitted to posterity with respect and reverence, and who obtained, and mellowed deservedly among his contemporaries, the title of the Northern Apostle. By his unwearied application he had amassed a great stock of knowledge, and was indeed ignorant of no part of learning at that time in fashion. He had given more than common attention to the study of the dead languages, to hist ory and divinity; he is said to have excelled in poetry, but he expended little time in the pursuit of any thing that was foreign to his profession. His temper was naturally warm, but, by degrees, he succeeded in obtaining an entire command of himself. His disposition was serious, yet, among his particular friends, he was cheerful and even facetious. His severity had no other object but himself: to others he was mild, candid, and indulgent. Biog. Brit.

GILPIN, SAWREY, who lately practised horse painting with so much success, was born at Carlisle in 1753, from whence, after having acquired some relish for the art from his father, who was a captain in the army, came to London, and was articled to a ship-painter. His first interesting works were composed of some market groups which struck his eye from his window. Soon after he went to Newmarket, being encouraged by the late William, duke of Cumberland, who executed many compositions which might have vied with Hogarth in point of character. In the duke's flnd he acquired that knowledge of the horse which he has displayed with such superior spirit and beauty, and when we fee with what felicity he applied it to the higher departments of the art, to historic compositions in the triumph of Camillus, the election of Darius, the story of Phoebus, we must lament that such talents should have been drawn aside to the meaner employment of horse-portrait-painting, which occupied too much of his valuable life. His drawings of animals, in pencil and water-colours, display a degree of taste and skill seldom attained. As a man he was equally esteemed for probity of character and simplicity of manner, and, as a member of the Royal Academy, he added honour to the institution. Tufnell's Pilkinson.

GILSON, in Geography, a township of America, in Cheshire county, New Hampshire, containing 484 inhabitants; situated on the E. side of Ahaulet river, and joining Keene on the south.

GILT, in Rural Economy, a term signifying a young female pig, whether in an open or penned sty.

GILT-HEAD, in Ichthyology, See Aurelia and Sparus.

GIMAR, in Geography, a town of the island of Cuba; 6 miles E. of Havana.

GIMBLET, in Carpentry, a small boring tool, which enters the wood with a screw; the part above is cylindrical, both inside and out; its use is to make a way for nails, in order to drive more easily, or to prevent the wood from splitting.

GIMBLETING, in Sea-Language, is applied to the anchor, to denote the action of turning it round by the stock, so that the motion of the stock appears similar to that of the handle of a gimlet, when it is employed to turn the wire.

GIMBOLS, denote the brass-rings by which the steering is suspended in its box that usually stands in the blossom.

GIMIESCH, in Geography, a town and castle of Hungary; 10 miles W. of Bukans.

GIMIGLIANO, a town of Naples, in Calabria Ultra; 3 miles E. of Nacifara.

GIMMER, a town of Africa, in Darfur; 40 miles N.N.W. of Coblé.

GIMMER HOG, in Rural Economy, a name applied to a female sheep of the first year.

GIMMER LAMB, a term applied to a female lamb.

GIMONT, in Geography, a town of France, in the department of the Gers, and chief place of a canton, in the district of Auch; 12 miles E. of Auch. The place contains 2366, and the canton 8413 inhabitants, on a territory of 230 square kilometres, in 13 communes.
GIN

GINZO, in Scripture Geography, a city of Judah, which the Philistines took from Ahaz. 2 Chron. xxviii. 18.

GIN, in Geography, a town of China, of the third rank, in P'otcheh; 10 miles S.E. of Chuseo.

Gin, formed probably by corruption from engin, in Artillery and Mechanics, is a machine for raising great weights, composed of three long legs, two of which are kept at a proper distance by means of two iron or wooden bars fixed to one of the legs by means of a bolt at one end, and by the other end to the other leg with a bolt and key, so that it may be put on or off at pleasure. At three feet from the bottom is a roller moving in sheets, that are fastened to these poles by two iron hands and two iron bolts. The three legs of this machine are joined together with an iron bolt, about which they move; to this bolt is fixed an iron half ring to hook on the windlass, containing two brafs pulleys. When the gin stands upright, and its legs are at a proper distance, one end of the cable is fixed to the dolphin of a gun or mortar with another windlass, containing likewise two brafs pulleys, and the other pulses through the pulleys and round the roller, which is turned round by means of handspikes passing through the holes in the ends of the roller; while a man holds the cable tight, the gin is raised to such a height as to admit a carriage being put under it.

The gin is used in loading a timber-carriage with timber; it consists of an acute triangular frame, in the lower part of which is a roll or windlass: at the apex is a set of pulleys, and a hole to receive the top of a strong pole, which is set up opposite the triangular frame, which by this means forms a sort of tripod (or triangle, as it is commonly called among workmen) standing across a tree to be raised and loaded: the gin-rod is then recved through a movable block of pulleys, fastened by a chain to the tree, through that in the top of the gin and round the roll; and then, by means of hand-spikes or levers used to the roll, the tree is drawn up to a sufficient height for the timber-carriage to be paffed under it. Long trees are raised at one end first, and then of the wheels of the timber-carriage are paffed under them; when the other ends are raised in like manner, and the other two wheels (which are made to separate for this purpose) are paffed under them, and then are joined to the other wheels by the long adjustable pole with which the carriage is furnished. See Timber-Carriage.

An erect axis or drum, turned by the force of horses walking in circles, and used for raising coal and other weights, is also called a gin; the buckets being attached to the opposite ends of a rope, which passes round the drum, and which is drawn by means of its adhesion to the drum, One of the bucket's descends empty, while the other is drawn up full; and when the motions of the buckets are to be changed, the horses are turned, or the wheels are made to impel the axis in a contrary direction, when any other moving power is employed.

For shallow mines or shafts, these are worked by horses, and are called horse-gins; and in deep mines thus worked, it is usual to have two levers projecting from the shaft, to as to employ two horses, and even four in some cases, with a bay to each pair, or single horse, to stop and turn them, as to draw from the other side of the lever, as often as a curve or basket arrives at the top of the shaft. See the article Coal.

The increasing depth of the pits, and demand for coals at N'wesle, occasioned Mr. Smeaton, the engineer, to apply to the proprietor of Long Benton colliery, to contrive them a mode of drawing more expeditiously, and larger baskets of coals than the horse-gins then in use, and he accordingly erected for them a water-gin, the supply for which was raised by the steam-engines employed at the pits. Since the above period, small steam-engines, called winneys in many places, have been applied to the winding of coals, and other minerals, and have already superseeded all other modes of drawing at the large collieries; these several modes of drawing or winding we shall describe particularly in the article Winding-Engine.

GIN, in Mining, horse-gin, or coal-gin, is a machine used for drawing buckets or curves of earth or minerals up a mine-shaft or tunnel-pipe of a canal; it consists of a large vertical drum or barrel, on which a rope winds, which is conducted to pulleys over the shaft; and usuafly as one bucket or curve descends another ascends. See the preceding article and Mine Winding Engine.

GIN-driver, is the man or boy who attends the gin-horse and turns him, when a full bucket or curve has arrived at the top of the mine-shaft.

GINAIRI, in Geography, a town of Africa, in Kumbo.

GINANNIA, in Botany, so called by Scopoli and Schreber in memory of Count Joseph Giannelli, a native of Ravenna, whose pithy humorous works in Italian, comprising two folio volumes, with about 90 plates, were published in Venice in 1755. They chiefly relate to the marine productions of the Adriatic, as corals, sea urchins, &c. but are perhaps not too severally charactarized by Linnaeus, in a letter to Gerard, as of no manner of use." The author was recommended to the study of natural history by his friend Valpieri, as a cure for hypochondriac disorders, but this is hardly a sufficient reason for the publication of his book. Haller appears to have seen the first volume only. Schreb. 271. Mart. Mill. Dict. v. 2. (Paloue; Aubl. Guian. 365. t. 141. Paloue; Jull. 351. Brownea pauciflora; Wild. Sp. Pl. v. 3. 716.) See Brownea, to which genus we are perhappled this plant is rightly referred by Wilkeson at the fugelation of Schreber, Addenda. 829. The fien is shrub-

GINASSERVIS, in Geography, a town of Afta, in

GINASSEURIV, in Geography, a town of France, in the department of the Var, and chief place of a canton, in the district of Brignolles; nine miles N.W. of Barjols. The place contains 925, and the canton 8650 inhabitants, on a territory of 924 square kilometres, in 1851 communes. See GINASSEURIV, in Geography, a town of Afta, in Syria, situated on a mountain, E. of the gulf of 1765.

GINDEL, in Geography, a town of Candelur, on the Beld; 48 miles E.S.E. of Cabul.

GINERE, a town of Ceylon; five miles N of Point de Gail.

GINERCA, a town of the island of Corfca, situated in a small bay to which it gives name; 13 miles S. of Calvi.

GINESTAS, a town of France, in the department of the Cenva, and chief place of a canton, in the district of Narbonne; seven miles N.W. of Narbonne. The place contains 581, and the canton 6753 inhabitants, on a territory of 1655 square kilometres, in 15 communes.

GINETO, St., a town of Naples, in Calabria Cura; 16 miles N.W. of Bifammou.

GINETTA, GENETTA, or Geet, in Zoology, the Viverra genetta of Linnæus, which see.

GINEE,
GIN

GINGEE, in Geography, a town and fortress of Hindoe-stan, in the Carnatic, once the capital of a kingdom of the same name, situated on a mountain and defended by three coves: 33 geographical miles from Pondicherry and 23 from Trinomally. N. lat. 12° 16'. E. long. 79° 36'.

GINGER, in Botany. See Amonum.

Gingsen, Zingiber, in the Materia Medica, &c. Ginger is either black or white. In Jamaica this plant attains its full height and flowers about August or September, and fades about the close of the year. When the stalks are entirely withered, the roots are in a proper state for digging, which is generally performed in the months of January and February. After being dug, they are picked, cleansed, and gradually feethed, or scalded in boiling water; they are then spread out, and exposed every day to the sun till sufficiently dried; and after being divided into parcels of about ten, weight each, they are packed in bags for the market: this is called the "black ginger." "White ginger" is the root of the same plant, but instead of scalding the roots, by which they acquire the dark appearance of the former, each root is picked, scraped, separately washed, and afterwards dried with great care: by this operation more than double expence is incurred, and the market price is proportionably greater. 

This warm aromatic root appears, says Lewis, to be much less liable to the corruption than might be expected from the penetrating heat and pungency of its taffe, and the fixedness of its active principles. But Dr. Cullen is of opinion, that there is no real foundation for this remark. It gives part of its virtue to water, and the whole to rectified spirit, tinging the latter of a deep, and the former of a pale yellow colour. This latter property it possesses in so considerable a degree, that if a watery infusion of this root be boiled down to a thick consistence, dissolved in a large quantity of water, and strongly boiled down again, the heat and pungency of the root remain, but with little or nothing of its taffe. It is used medically as an antispasmodic and carminative. The cases in which it is more immediately serviceable are flatulent colics, debility and laxity of the bowels and intestines, and in torpid and phlegmatic confluxions to excite brisker vascular action. It is seldom given but in combination with other ingredients. In the Pharmacopoeia it is directed to be administered under the form of a syrup and tincture; it is also preferred as a condiment, and as a subsidary ingredient in many compositions. The syrup of ginger is prepared by macerating two ounces of the ginger root sliced in a pint of boiling water for twenty-four hours, and then draining, and adding two pounds of refined sugar, as in other syrups. The tincture of ginger is formed by macerating two ounces of ginger root sliced in two pints of proof spirit for 14 days, and then draining the liquor. The dietetic qualities and uses of ginger are well known; and it is employed under various forms. It is not uncommon to candy the root, when green, with sugar and honey; having first steeped it some time in water, to take away part of its acrimony, and to dispoze it to let go the outer skin. This candied ginger, brought from abroad, is moderately aromatic. They also make a marmalade of it, and dry cakes.

The northern people make great use of this confection, as holding it sovereign against the feverry. The Indians eat the root, when green, by way of fallad, first chopping it small, mixing it with other herbs, and seasoning it with oil and vinegar.

Ginger may be preferred by washing it, and laying it to steep for ten or twelve days in white wine, and water, stirring them every day; then boil a pound of roots with two quarts of white wine, and about a pint of lemon juice, for a quarter of an hour; then add two pounds and a half of fine sugar, and boil it to a syrup, semmising it as it rifes; let it by till the next day in a glazed pan; then boil it for half an hour, and repeat this boiling at the same interval till the ginger is clear. Put it into glafes, and cover them with paper, and it will afford a fine fwerment for the winter. A wine is made of ginger, which is a pleasant and palatable beverage.

GINGER, in Geography, one of the smaller Virgin isles in the West Indies; 10 miles S. W. of Virgin Gorda. N. lat. 18° 5'. W. long. 62° 53'.—Alfo, a town in Egypt, on the E. branch of the Nile, opposite to Mansorah.

Gingerbread, a richer kind of bread; the flavour and taffe of which are heightened and improved with spices, and particularly ginger; whence the name.

There are various forms and preparations of gingerbread: we shall content ourselves with the following receipt, which is well recommended.

Into a pound of almonds, blanched and pounded, grate a penny white loaf; sift and beat them together; to the mixture add an ounce of ginger, diced fine; and liquorice, and aniseed in powder, of each a quarter of an ounce; pour in two or three spoonfuls of rofe-water, and make the whole into a paffe, with half a pound of sugar; mould and roll it, print it, and dry it in a flove. Others make it of treacle, citron, lemon, and orange-peel, with candied ginger, coriander, and caraway-seeds, mixed up with as much flour as will make it into a paffe.

GINGERNO, or Lendero, in Geography, a kingdom of Africa, situated on the S.W. of Abyssinia. N. lat. 6° E. long. 12°.

GINGHAM, a town on the north coast of Sumatra. N. lat. 5° 10'; E. long. 96° 10'.

GINGIDUM, in Botany, a name adopted by Forster, Nov. Gen. t. 21, for an umbelliferous plant, found on the hills of New Zealand, which he himself suspected to be Liguicium, and which has been so confidered by following botanists. It is Liguicium Gongidum of Willd. Sp. Pl. v. 1. 1428. See Ligusticum.

The 357868 of Diofcorides appears to be likewife of this natural order, but the species can scarcely be determined with certainty. Dr. Sibthorp fupposed it might be Daucus Gongidum of Linneus, merely from the coincidence of the names, for it agrees better with D. Pisonaga, Anini Pisonaga, Prod. Pl. Grec. n. 652; not that any thing can be gathered, from the description of Diofcorides, to quote him, in fuch a cafe, with any propriety. He fays it is "by fome called Lepidium, and grows very abundantly in Cilicia (now Caramania) and Syria. It is a little herb, like wild carrot, but more flender and more bitter, with a whifh and bitterfl fcript." This will be found to accord equally well with many plants of those countries. Matthiolus, indeed, as it seems, either by a Latin verion, or by the opinion of thofe who take the 357868 of Diofcorides for the Pajmnaca, or Parphn, whereas it is evidentally by the description a Daucus, or Carrot, took for the 357868 a Syrian plant, firft defcribed by himfelf, and which indeed is smaller and flenderer than the Parphn, though larger and broader than the Carrot. Hence he confiders thofe who have taken the Chervil, Scandia Cerfeedium, for the herb in quefion, though they really appear to be more in the right than himfelf. However this may be, the plant of Matthiolus is the Daucus Gongidum of Linneus, as well as his D. Judiculis.

LIX
GIN

Linnæus having in the first instance defined it from the wooden cut of Matthiolus, and in the latter described it from a specimen in the Upala garden. The history of this mistake is given at length, by the writer of the present article in the Transactions of the Linnean Society, v. 4. 131.

GINGO, in Mining, meaning or flaming, signifies the lining of a mine-shaft with rocks or bricks for its support. Shallow shafts, where the measures are adapted to stand, are sunk first, and the lining of them with stone, or ginning, is begun from the bottom and carried up at once to the top; but in sinking deep shafts, after a great depth is done at once as the nature of the measures will permit, a further depth is sunk in the bottom, beginning with the shaft, and the shaft of that diminished diameter for 18 or 18 inches, according to the soundness of the measures in that place, when it is gradually enlarged to the full size as the sinking proceeds, and sunk from yards lower, until upon reaching a bed of stone, or as great a depth as is judged safe, according to the nature of the sinking, the ginning begins, and carried up to where the diminishing of the shafts begins; when the same is picked out to admit the necessary courses of stone or bricks, as high as is judged safe, then the removal of the remainder of the support for the first ginning is commenced, by cutting out a piece, wide enough to admit of one or two courses of stone bricks, being built up like a pier, which is firmly keyed or underpinned to the ginning above by means of tile-hulls or thin plates if necessary: a similar piece is then cut out and underpinned on the opposite side of the shaft, and then another between each of these, and so on, until the ginning of the lower and upper part is entirely joined and all round the shafts.

The shaft is then deepened within the last ginning and fired, first narrow and then of its proper width, as far as is judged safe, when a new ginning is begun, and carried up, and joined to that previously finished, as above described. Solid stone-hulls or permanent rocks, which are met with in sinking, are not ginned, but the shaft is sunk through such rocks, of the same diameter as the inside of the ginning, which stands upon their top and is pinned up beneath the bottoms.

GINCO, or GINGROS, in Geography, a town of the Valais; 10 miles W. of Aigle.

GINOA, in Antiquity, a kind of dance used at funerals.

GINGRA, in Antiquity, a kind of dance used at funerals.

GINGRAS, or GINGRAS, in the Ancient Music, a dance performed to the sound of flutes.

GINGRIMA, in Antiquity, a name given to a small kind of flute used for beginners.

GINGRAS, and GINGRAS, Musical Instruments of the Ancients. The Phrygians, according to Athenaeus, had flutes of only a palm in length, which produced a sweet, but plaintive sound. The Carians made use of them in their funerals; perhaps by Carus the Phrygians are meant here, as in Cora and Bathylides. These flutes derive their name from the Incantations of the Phrygians at the death of Adonis, whom they called GINGRAS. Encycl. Suppl.

GINHEIM, in Geography, a town of Germany, in the county of Hanau, Munzenberg; 11 miles W. of Hanau.

GIN-HOA, a town of China, of the third rank, in Quang-tong; 22 miles N. of Chao-tehuen.

GIN-VOAL, a town of China, of the third rank, in Se-tchenen; 32 miles S. of Tehel-leou.

GINGPALIAGARUM, a town of Hindostan; 25 miles E. of Calicute.

GINKGO, in Botany, Linn. Mant. 531. ramp. Amoen. 811. t. 812.—The Japanese name of a tree, as large as a Walnut-tree, with leaves resembling an Adiantum. The male flowers are in catkins, the female solitary, on flanks, producing a drupa, whose not reimbs that of a Pteridium, with a white, somewhat astringent, kernel, which is eaten in Japan, being supposed to afford digestion. This tree is hardy in our gardens, sometimes bearing catkins, but no fruit. The late Mr. Gordon sent a living plant to Linnæus, who mentions it in an appendix by the above appellation, not being able either to define the genus, or to name it properly, till he knew the fructification. Mr. Salicinus having with great advantage determined its essential characters, it was dedicated to him, by Dr. Smith in the Trans. of the Linn. Soc. v. 3. 520 and his botanical merits will ever justify the appellation. See Sarracen.

GIN-KIA-CENTZE, in Geography, a town of Chinese Tartary. N. lat. 41° 45'. E. long. 125° 29'.

GIN-KIEOU, a town of China, of the third rank, in Pech-ehi; 17 miles N. of Hsok-ien.

GINLIA, a town of Naples, in Abruzzo Ultra; 12 miles N. E. of Teramo.

GINNAI, Francis, in Biography, was born at Ravelia in 1716. He was educated in his father's house, and at the age of fourteen was placed at Parma, as page to the duke of Antony Farraffe. The duties of this situation did not prevent him from pursuing his studies, and he was particularly attentive to natural history, under the direction of his uncle Joseph Ginnari, who was well known for his researches into marine productions. He devoted himself to a retired and studious life, and was the inventor of divers agricultural instruments and other machines, useful as well as curious. His writings, which relate to almost all the departments of natural history, obtained for him an admission into the learned societies of London, Paris, Bern, and Perugia, and he held a literary correspondence with many of the most eminent natural philosophers of the age. In private life he was courteous, modest, and benevolent; and he was particularly observant of the duties of religion. He died at the age of forty. His principal work was a treatise on the diseases of corse, with observations on the caudles and remedies. He published an account of the natural productions in the museum of Ravelia, and he greatly interceded himself in the institution of the society of that town. He left behind him some manuscripts, among which was a "Natural and Civil History of the Pine Forests of Ravelia." Gen Bug.

GINNIS, in Geography, a town of Turkish Armenia; 21 miles W. N. W. of Erzerum.

GINNISH, a town of Hindoostan, in Guzerat; 56 miles S. of Ambedabad.

GINOYAN, a town on the E. coast of the island of Leyta. N. lat. 10° 27'. E. long. 123° 10'.

GIN


Gen. Ch. Col. Perianth inferior, of one leaf: tube bell-shaped; limb fix-cleft; segments lanceolate, spreading, coloured, permanent. Cor. Petals fix, roundish, spreading, longer than the calyx, with long claws inserted into the neck of the calyx. Stam. Filaments 12, awl-shaped, the length of the calyx and inserted into it; anthers kidney-shaped. Pet. Germin roundish, depressed; style awl-shaped, as long as the corolla, not deciduous; stigma obtuse. Pers. Capsule roundish, depressed, thinning, coloured, with about four furrows and four valves, of one cell, gaping at the top. Seed numerous; receptacle roundish, large. Eff. Ch. Calyx fix-cleft. Petals fix. Capsule of one cell, with four valves, coloured, with many seeds.

1. G. americana. Linna. Sp. Pl. 652. Jacq. Amer. 91.—Native of the rocky and gravelly banks of rivers in the island of Cuba. This beautiful shrub has much of the aspect of a myrtle, and bears its flowers and ripe fruit in December. It rises erect to the height of three or four feet, and its branches are round, smooth, and woody. Leaves lanceolate, entire, smooth, spreading, on short footstalks, opposite; an inch and half long, numerous. Stalks single-flowered, slender, axillar and terminal. Flowers inodorous, with a reddish calyx, blue corolla, and dark-red capsule, containing a most beautiful berry. Seeds whitish.

The capsule remains entire for some time after the seed is fixed, together with the calyx and part of the style. The natives call this plant Roja del rey, or river Rose.—It has never been introduced into the gardens of Europe, nor have we ever seen a dried specimen.

GIN-PIN, in Geography, a town of China, of the third rank, in Chin-chang; 17 miles N. of Tong-chang.

GIN-SENG, or Nin-seng, in Botany. See Pinax.

GIN-seg, in the materia medica, is one of the principal medicines of the Chinese and Tartars; and their most eminent physicians have written many volumes concerning its virtues.

It is known among them by divers other names, expelling only spirit, or the pure spirit of the earth; the plant gives immortality, &c. It makes, in effect, the whole materia medica for the people of condition, but is too precious for the populace.

All the writers of the Chinese affairs make mention of the gin-feng: as Martinus, in his Atlas; F. Kircher in his China Illustrata; F. Tuchard, in his Voyages; and F. Le Comte, in his Memoirs.

And yet we know but very little of this plant before F. Jartout, a Jesuit, and missionary in China; who, being employed, by order of the emperor, in making a map of Tartary, in the year 1729, had an opportunity of seeing it growing in a village about four leagues from the kingdom of Corea, inhabited by Tartars, called Cola-Tutza.

That father took this opportunity to make a draught of the plant, and give an accurate description of it, with its virtues and manner of preparing it. The gin-feng, according to his description and drawing, has a white root, somewhat knotty, about three inches of the stem, and which grows tapering to the end; at few inches from the head it generally parts into two branches, which gives it some resemblance of a man, whose thighs the branches represent; and it is hence it takes the denomination gin-feng, which signifies a figure of a man.

It is hard to say, why the Chinese should call it gin-feng, a word which signifies figure or representation of a man: neither that father, nor any he enquiring of, could ever find, that it bore more resemblance to the figure of a man than is ordi-

narily seen among other roots. The Tartars, with more reason, call it oroba, that is, the first of plants. It grows to the height of about eighteen inches.

The plant dies away every year; the number of its years may be known by the number of stalks it has shot forth, of which there always remains some mark.

Those who gather the gin-feng prefer only the root; and all they can get of it in ten or fifteen days time they bury together, in some place under ground; then they take care to wash it well, and scour it with a brush; then dip it in cold water, and prepare it in the furnace of a fort of yellow millot, which gives it part of its colour. The millot is put in a vessel, with a little water, and boiled over a gentle fire; the roots are laid over the vessel, upon small transverse pieces of wood, being first covered with a linen cloth, or some other vessel placed over them.

They may also be dried in the sun, or by the fire; but then, though they retain their virtue well enough, they have not that yellow colour which the Chinese so much admire. When the roots are dried, they must be kept close in some very dry place; otherwise they are in danger of corrupting, or of being eaten by worms.

As to the place where this root grows, it is between the thirty-ninth and forty-seventh degree of north latitude, and between the tenth and twentieth degree of east longitude, reckoning from the meridian of Pekin. Here is found a long tract of mountains, which thick forests, that cover and encompass them, render almost impassable; it is upon the declivities of these mountains, and in these thick forests, upon the banks of torrents, or about the roots of trees, and amidst a thousand other different sorts of plants, that the gin-feng is found; it is not to be met with in plains, valleys, marshes, the bottoms of rivulets, or in places too exposed and open.

If the forest takes fire and be consumed, this plant does not appear till two or three years after; it also lies hid from the sun as much as possible, which favors that heat is an enemy to it.

The places where the gin-feng grows are, on every side, separated from the province of Quang-tong by a barrier of wooden flakes, which encompases this whole province, and about which guards continually patrol, to hinder the Chinese from going out and looking after this root.

Yet, however vigilant they are, greediness after gain incites the Chinese to lurk about privately in these deserts, sometimes to the number of two or three thousand, at the hazard of losing their liberty, and all the fruits of their labour, if they are taken either as they go out of or come into the province.

The emperor, in order that the Tartars should reap all the advantage that is to be made of this plant, rather than the Chinese, gave orders, in 1759, to ten thousand Tartars, to go and gather all they could find of the gin-feng, upon condition that each person should give him two ounces of the herb, and that the reil should be paid for, weight for weight, in pure silver.

It was computed, that, by this means, the emperor would get this year above twenty thousand Chinese pounds of it, which would not cost him above one-fourth part of its value.

We met, by chance, says F. Jartout, with some of these Tartars, in the midst of their frightful deserts; and their mandarins, who were not far out of the way, came one after another, and offered us oxen for our subsistence, according to the commands they had received from the emperor.

L. 12
This army of herbalists observed the following order: after they had divided a certain tract of land among their several companies, each company, to the number of a hundred persons, spread itself out in a right line, to a certain fixed place, every ten of them keeping at a distance from the rest. Then they searched carefully for the plant, going on leisurely in the same order; and in this manner, in a certain number of days, they run over the whole space of ground appointed them. When the time was expired, the mandarins, who were encamped in their tents in such places as were proper for the sublimation of their horses, sent to view each troop, to give them fresh orders, and to inform themselves if their number was complete.

If any one of them was wanting, as it often happened, either by wandering out of the way, or being attacked by wild beasts, they always looked for him a day or two, and then returned again to their labour as before.

Gin-feng was formerly supposed to grow only in Chinese Tartary, affecting mountainous situations, shaded by clove woods, but it has now been long known that this plant is also a native of North America, whence M. Sarrafin transmitted specimens of it to Paris in the year 1754; and the gin-feng since discovered in Canada, Pennsylvania, and Virginia, by Lafitau, Kalm, Bartram, and others, has been found to correspond exactly with the Tartarian species, and its roots are now regularly purchased by the Chinese, who consider them to be the same with those of eastern growth, which are known to undergo a certain preparation above-mentioned, by which they assume a somewhats different appearance. This plant was first introduced into England in 1749 by that indolent naturalist, Peter Collinson. The dried root of gin-feng, as it is imported here, is scarcely as thick as the little finger, about three or four inches long, frequently forked, transversely wrinkled, of a horn color, and both internally and externally of a yellowish white colour. To the taste, says Lewis (Med. Med.), it discovers a mucilaginous sweetness, approaching to that of liquorice, accompanied with some degree of bitterness, and a slight aromatic warmth, with little or no smell. It is far sweeter, and of a more grateful smell, than the roots of fennel, to which it has by some been supposed similar; and differs likewise remarkably from those roots, in the nature and pharmaceutical properties of its active principles; the sweet matter of the gin-feng being procured entire in the watery as well as the spirittuous extract, whereas that of fennel-roots is destroyed or dissolved in the infusipation of the watery extract. The slight aromatic impregmentation of the gin-feng is likewise in good measure retained in the watery extract, and perfectly in the spirittuous.

The gin-feng, we have observed, is an ingredient in most of the medicines which the Chinese physicians prescribe to the better sort of patients: they affirm, that it is a sovereign remedy for all weakneces occasioned by excessive fatigues, either of body or mind; that it attenuates and carries off pititious humours; cures weakneses of the lungs and the pleurisy; stoppeth vomitings; strengthens the stomach, and helps the appetite; disperseth fumes or vapours; fortifies the breath; is a remedy for short and weak breathing; strengthens the vital spirits, and is good against dizziness of the head and dimness of sight; and that it prolongs life to extreme old age. Nobody can imagine, that the Chinese and Tartars would set so high a value upon this root, if it did not constantly produce a good effect: those that are in health often make use of it to render themselves more vigorous and strong. And I am persuaded, adds father Jartoux, above-mentioned, it would prove an excellent medicine in the hands of any European who understands pharmacy, if he had but a sufficient quantity of it to make such trials as are necessary to examine the nature of it chemically, and to apply it in a proper quantity, according to the nature of the distemper for which it may be beneficial.

It is certain, that it sublimes, increases the motion of, and warms the blood, that it helps digestion, and invigorates in a very sensible manner.

After I had designed the root, he goes on, I observed the state of my pulse, and then took half of a root, raw as it was, and unprepared; in an hour after I found my pulse much fuller and quicker; I had an appetite, and perceived myself much more vigorous, and could bear labour better and easier than before. Four days after, finding myself so fatigued and weary, that I could scarcely sit on horseback, a mandarin, who was in company with us, perceiving it, gave me one of these roots: I took half of it immediately, and an hour after I was not in the least sensible of any weariness. I have often made use of it since, and always with the same success. I have observed also, that the green leaves, and especially the fibrous part of them, chewed, would produce nearly the same effect. The Tartars often bring people the leaves of gin-feng instead of tea: and always find myself so well afterwards, that I should readily prefer them before the beet tea; their decoction is of a grateful colour, and, when one has taken it twice or thrice, its taste and smell become very agreeable.

As for the root, it is necessary to boil it a little more than tea, to allow time for extracting its virtues, as is practiced by the Chinese, when they give it to sick persons; on which occasion they seldom use more than the fifth part of an ounce of the dried root.

To prepare the root for exhibition they cut it into thin slices, and put it into an earthen pot well glazed, with about half a pint of water: the pot is to be well covered, and let to boil over a gentle fire; and, when the water is consumed to the quantity of a cupful, a little sugar is to be mixed with it, and to be drank immediately after this, as much more water is to be put to the remainder, and to be boiled as before, to extract all the juice, and what remains of the spirittuous part of the root.

These two doses are to be taken in the morning, and the other in the evening. Phil. Trans. N° 337, or Abridg. vol. iv. part ii. p. 314, &c.

Gin-feng has been considered by the Chinese as a powerful aphrodisiac; but a fact to the contrary is alleged by Dr. Cullen in his Med. Med. v. i. p. 261. High as the virtues of this root have been extolled by the Chinese, and by others, upon their authority, we know of no proofs, says Dr. Woodville (Med. Bot.), of its efficacy in Europe, and from its sensible qualities, we judge it to posses very little power as a medicine. It is recommended in decoction, viz. a dram of the root to be long boiled in a sufficient quantity of water for one dose; but it has been omitted in the last edition of the London Pharmacopoeia.

GIO, in Geography, a cape of Scotland, on the N. coast of the island Shapmuka.

Gio, St., a town of Italy, in Friuli; 11 miles W. of Palma la Nova.

Gio di Fiore, St., a town of Naples, in Calabria Citra; 16 miles W.S.W. of Umbratico.

Gio in Pelagia, St., an island in the gulf of Venice, near the coast of Thrace. N. lat. 45° 15'. E. long. 13° 49'.

GIOAR, in the Materia Medica of the ancient Arabians, a word
a word applied to several different substances, and sometimes used as the distinct names of them; sometimes only as an epithet to them. It is generally used by Avicenna as a name for arsenic, sometimes for antimony; and in Scopion, we often find it standing for any of the mineral poisons. The original meaning of the word is no more than what the Greeks expressed by the word σέληνου, falsehood; but it became applied to several things most eminent in their way; as to arsenic, the most fatal of poisons; to antimony, supposed at that time the most valuable of medicines; and to pearls, as the most valuable of gems.

GIOBAR, in Geography, a town of Afinic Turkey; in the province of Dinarbekir; 20 miles N.W. of Tebrit.

GIOCONDO, FRAN. GIOVANNI, in Biography, who flourished in the sixteenth century, was a native of Verona, where he taught the learned languages for a subsistence. Among his pupils was the celebrated Julius Caesar Scaliger. He afterwards became a monk, and was claimed as a brother both by the Dominicans and Franciscans. He was extremely learned in mathematics, and contributed much to the revival of classical learning, by the collection of ancient manuscripts and manuscripts. He presented to Lorenzo de Medici a collection of ancient inscriptions which he had compiled in Rome. Giocondo was some time at the court of the emperor Maximilian. He visited France, and was employed to build two bridges over the Seine. After this he obtained the title of Architecht-royal in France. The time of his death has not been ascertained; it is supposed he did not survive very long, the year 1521, as he calls himself an old man, eight years before this, in the dedication of a work to Juliano de Medici. He materially served the cause of literature by several works, which did him much credit as a writer, as they likewise extended his fame as an artist. He published an edition of Pliny's epistles, and gave a correct edition of Vitruvius, illustrated with figures, which he dedicated to pope Julius II. He took a part in editting many other works of the ancients, and was the first person who gave a design of Caesar's bridge over the Rhine. In 1506 he wrote four dissertations, addressed to the magnificency of Venice, concerning the waters of that city. He was employed with Raphael and San Gallo in superintending the erection of St. Peter's. His last work was, probably, the rebuilding of the Rome bridge of Verona. Gen. Biol.

GIOFAR, AI, in Geography, a town of Arabia; 8 miles S. S. E. of Raboghe.

GIOGI, a town of Transylvania, situated near the Maros; 14 miles S. W. of Millenbach.

GIOJA, or GIOVA, FLAVIO, in Biography, was born at Pafion, near Amalby, in the kingdom of Naples, about the year 1520. Little is known of the history of his life, except that he is thought to have been the discoverer of the directive power of the magnet, by which it dispenses its poles along the meridian of every place, or nearly so, and to have applied this important fact to the purposes of navigation, under the form of a compass. As a proof that this instrument was the invention of a subject of the king of Naples, who was a junior branch of the royal family of France, it is said he marked the north point with a fleur-de-lis, by which it is distinguished by the people of every country. As a memorial of this discovery, the territory of Principato, in which Gioja was born, bears, for its arms, a compass. It must not, however, be concealed, that the French and the English have claimed for themselves the honour; and many authors of reputation have given it to the Chinese, who are reported to have known its use long before their intercourse with Europeans, and that the secret was brought to Italy by Marco Polo. Moreri. See the article Compass.

GIOJA, in Geography, a town of Naples, in the province of Barri; 14 miles S. S.W. of Converiano.—Alfo, a town of Naples, in Abruzzo Ultra; 7 miles S. E. of Celano.—Alfo, a town of Naples, in Calabria Ultra; 7 miles S. of Nicotera.

GIOVELLI, a body of the falibis, or hordes, in the service of the grand signor.

GIONI PIANO, Sr. in Geography, a town of Naples, in Capitanata; 8 miles S. S. W. of Lefina.

GIOARASH, a town of Arabia, in Yemen; 60 miles N.W. of Saude.

GIORDANI, VITAL, in Biography, was born at Bitonto, a town belonging to the kingdom of Naples, in 1653. He was intended for the church, but deserted the studies necessary for that profession, and married when he had no means of providing for the support of a family. After this he led an idle life, quarreled with his relations, murdered his brother, and fought for safety by leaving his country. He entered as a common soldier on board the galleys, which pope Innocent X. sent against the Turks in the Levant. He was present in several actions, and gave abundant proofs of his courage and heroism. His talents led him to promotion and he was made purfer, a situation which obliged him to improve himself in arithmetic, of which he scarcely knew the elements. What his duty required him to learn, his inclination led him to pursue with pleasure and delight; he became an able mathematician, and was at length chosen professor of mathematics to Chrillina, queen of Sweden. Lewis XIV. appointed him professor of the same branch of science in the Academy of Sculpture and Painting. This was in 1666, and in 1672 pope Clement X. made him his engineer, and professor at the College de Wildom. By his great prudence, regularity, and temperamce, he redeemed his character, and died in his 78th year. His principal work is "Euclide Riffuto," 1666, folio. "Fundamentum Doctrinae Motus Gravorum," and "Ad Hyacinthum Chiliphorum Epistula." Moreri.

GIORDANO, LUCA, an historical painter, born at Naples in 1629. His father was an artist of no great repute, who, fancying his son Luca had an inclination to painting, employed him very early in the practice of the art; by which means he acquired an uncommon facility of handling the pencil, and succeeded in imitating the works of great masters. By this, when very young, he gained for his parents considerable wealth; and so eager was his father to make advantage of his ingenuity, that he scarcely allowed the youth time to eat his meals, but was continually urging him to pursue his labours by repeating so incessantly "Luca fa peflo, (Luca male baffe)," that his prece became his nick-name among his companions.

His first matter of any note was Joseph de Ribera, called Spagnoletto; to whose style he, for a time, so much adhered, as to puzzle the most discerning critics. From him he removed to Rome, where he industriously studied the style of his countrymen, and the works of eminent masters in the art. He fixed himself sufficiently with Pietro Cortona, by which it is probable his brilliant imagination was taught to expand itself in a more imperfection and trifling manner than it was originally capable of entertaining. His ready hand, and the freedom, boldness, and precision of his touch, was exactly what Cortona required, and with him he wrought upon many noble works in fresco; and was so incredibly expedient in that way, that he could dispatch as much work in a day, as any other painter could in a week. His imagination was exceedingly fertile; and this, with the readiness of his hand, and the conqueant abundance of his...
his productions, soon spread his fame over Europe. The
king of Spain (Charles II.) desiring to see his pant, and
to have the Eucharist adored by his hand, invited him there,
offering him to be paid 1500 ducats de Plata for the voyage,
and allowing him to freight the ship that brought him over
duty free. He also made him groom of the bed-chamber,
 honouring him with a golden key, but disdaining with his
attendance, that he might be more his own master.
Velasco says, that it is impossible to express the num-
ber and beauty of his compositions in Madrid, Toledo, and
at the Eucharist; and that he employed only two years to
paint ten arched ceilings of the church and bedside of that
palace. He was exceedingly indefatigable, generally painting
his or seven hours every day; and being highly favoured by
the king, became exceedingly rich. It was in 1692 that he first
arrived at Madrid, and did not return to Italy till 1721,
when he accompanied Philip V. to Naples, and in 1724
died there.

Previously to his going into Spain he had executed num-
erous works in Rome, Genoa, Milan, and other places; and
had produced a vast number of pictures in imitation of
Titian, Tintoret, Giorgione, &c. &c. which are extremely
correct, and exhibit the amazing power of his memory, and
the veracity of his genius. The extraordinary facility of
painting which he possessed, enabled him to work with great
facility in fresco, as well as in oil. This very facility is,
however, the cause that Giordano’s works will never be re-

garded as standards in the art of painting. Too great a
degree of freedom is an enemy to grandeur of style, and
the person who possesses it is apt to be too easily satisfied with
his productions; and indulging himself in the pleasure afforded
by the freehand and characters of colour and effect pro-
duced by it, is unwilling to disturb it in order to render the
parts more positively correct; and thus, though ever agree-
able, yet works wrought in this manner are too often flimsy
and weak in their effect on the mind. This is the charac-
ter of Luca Giordano, who, though a great master in the
art, ranks only in a second or third rate. One of his most
considerable productions is the altar-piece of the church of
the Assumption at Naples, representing the fall of Lucifer.
And in the Durazzo Polai at Genoa, is a time picture of
Seneca dying in the Bath; of which, also, there is a dupli-
cate in the gallery at Dresden.

GIO GIO

GIORGIO, in Geography, a town of Walachia, on
the N. side of the Danube; 40 miles S.W. of Bucharest.
In June 1771, the Rusians defeated the Turks near this
town, killing 5000 of them, and taking 180 pieces of can-
non, with artillery and baggage for 30,000 men. N. lat.
43° 38'. E. long. 25° 18'.

GIORGIO ANTONIOTTI, in Biography, an Italian
writer on music, who, having been a considerable time in
England, had a work entitled "L’Arte Armonica," trans-
lated into English, which he published in two vols. folio, by
subscription, under the title of "A Treatise on the Compo-
sition of Music," in three books, with an Introduction on
the History and Progress of Music from its beginning to this
time, written in Italian by Giorgio Antoniotti, and trans-
lated into English, 1763, printed by Johnson, Cheaps-
side.

We had at this time no well digested, clear, and ample
treatise of composition in our language. Morley’s treatise
was become scarce, obscure, and totally defective in every
thing that concerns modern music. We had indeed Mal-
colm’s treatise published in 1721, and that of Dr. Pepusch
in 1721. The first is dark and awkwardly written; the
second, though excellent as far as it goes, has some preju-
dices of the old school, which were totally abandoned in
1763, and it is too concise in many particulars to enlighten
or satisfy the doubts of young students in many essential
points, which were now necessary to be explained, and
which in the year 1731 had no existence. Gemmanini’s “Guida
Armonica,” so long expected, and published about the year
1746, puzzled thecafe, and disappointed every reader.
Much therefore was expected, even by professors, from a
work of two vols. folio, written by a famed Italian, and
nearly half the bill of subscribers consisted of the names of
the principal composers and organists of the time.

We had a miserable translation of Ranconni’s treatise,
written originally in a musical technics, totally different from
that to which we were accustomed, which, with the ungram-
matical and bad English into which the reit was translated,
tossed every one who attempted to read it into despair.
The sonatas and concertos of Corelli, published in score
by Dr. Pepusch, and the works of Handel and Gemmanini,
for those who took the trouble to score them, were excellent
lemons of counterpoint, if they had been properly fluided.
But it is astonishing how long even great performers on
instruments remain in utter ignorance of composition. Jack
James, Magnus, and Kiloway, though admirable organists,
ever attempted composition, and if they had, after a cer-
tain time, they would never have been bare of their ground,
but even in making a solo to a minuet or country dance
would have discovered to real judges, that they were not
regular bred contrapuntists.

Signor Antoniotti, we believe, was a perfect judge of
the mechanical rules of harmony; but his method is not
clear and intelligible to a student out of the reach of a
matter. His introduction, and historical account of the
progres of music from the system of the Greeks to the pre-
ent time, will amuse, though not accurately instruct, curious
readers.

He ascribes to Guido the invention of harmony, and to
John de Muris the invention of musical characters, as had
been long done by others, who, trudding to tradition, had
never seen the Micrologus of Guido, nor the Compendium
of John de Muris, by which it has been lately proved, that
the laws of harmony were unknown to Guido, and that de Muris
himself affirms the invention of musical characters to Magif
Francesco, who flourished 1647, near 300 years before John de Muris was born. (See FRAENCO and DE MURIS.)

So much for sig. Antoniotti’s historical part.

When he comes to practical music, his definitions are so
far from clear to readers in the first stages of counterpoint,
that they multiply the student’s doubts. His plates have
prima facie so feminine an appearance as to frighten a princi-
plante as much as teaching geometry or algebra would do.
His examples of notation are methodically placed; but the
joining the old and modern characters in the same table will
confuse the student’s idea. He begins with three characters
no longer in use, and the minuce, now the first and longest
note, ranks only as the fourth.

His general scale and system of intervals will terrify a
young student by the manner in which it is represented; his
system of harmonic combinations the same. Plates 14
and 15 of transposed scales are clear and useful, as are the
scales in the several ele
cs.

The rige he of the octave seems unknown to the author,
and his plain counterpoint is written entirely on a series of
elevens to have rising or falling by fourths and fifths totally
without modulation. No instructions are given for the use
of disords, but in examples a due et a he gives disords in
discriminately to every note, without informing the student
when and where to use them, or speaking of accented or un-
accented parts of a bar.
At plates 48 and 49 the answers to short examples of figure and imitation are clear and ingenious; but no instructions are given for melody throughout the work. And musical composition consisting of the union of melody and harmony, it seems, at least, to have merited a definition. He might have told the student that it consists of a pleasing series of figure notes of various lengths, arranged with grace, divided into equal measures by bars, phrased and governed by rules.

At pl. 49, ex. vii there are suppositions of lyrics in abundance between the second and third lines, unnoticed by the author.

Page 106, vol. i. the author very justly confines vocal fugues and canons, in which the several voices are fingering different words and syllables at the same time; but Roumieu had done this before, in his "Letter unre la Mélodie Française," 1751. His examples of fugue and canon, which he allows to have an admirable effect in instrumental music, are few and artless. No other examples are given of melody than chords broken into very common passages as variations. Nor of harmony or melody do we find more than two or three examples in triple time, and those of a very common and unmeaning fort.

We remember that the public was much disappointed by this work, which was silently put on the shelf, and has scarcely ever been mentioned since its publication.

GIORGIO GANDINI, a painter, fancied "del Crema." He was of Parma, and, if we believe Olandi, not merely one of Correggio's school, but a pupil, whose works the latter himself retouched. The principal picture in St. Michele, erroneously ascribed to Lebre Orb, is claimed for him by P. Zoppa; a performance, though in parts capriciously conceived, of an impulso, a relief, a sweetness of colour and pencil, to confer honour on the belt of that school. The eclect in which he was held by his fellow-citizens may be conceived, from the composition which they unanimously conferred on him after the decease of Correggio, viz., to paint the Tribune of the Duomo. Death prevented him from the execution of it, and the composition fell to a third, to Giradone Mazzuolo, though not yet ripe for an enterprise of such magnitude. Fuchel's Pilkinson.

GIORGIO, Sz., in Geography, a town of Naples, in Calabria Ultra; 17 miles S.E. of Nisotera.—Alfo, a town of the island of Letna; 44 miles E. of Letna.—Alfo, a town of France, in the department of the Po; six miles N.W. of Chiavado.—Alfo, a town of Naples, in the province of Otranto; four miles E. of Taranto.—Alfo, a town of Naples, in the same province; three miles N.W. of Nardo.—Alfo, a town of Naples, in the province of Principato Ulta; three miles S.E. of Benevento.—Alfo, a town of Italy; 10 miles N.W. of Verona.—Alfo, a town of Italy, in the department of the Reno; 11 miles N. of Bolagna.

GIORGIONE DA CASTEL FRANCESCO, or GIORGIO BAREARELLI, in Biography, was a painter of most uncommon talents, who disputed the rank of head of the Venetian school with Titian. He was born at Callato-Francio in 1477, and acquired the name of Giorgione as well from his superior mode of feeling in art, as from the beauty and elegance of his person and manner. He at first became a scholar of Giovanni Bellini, but soon shook off the minuteness and trifling labour of that school, and sublimated breath and fulness of handling and effect. Vafari observes, that Giorgione, having seen some works of Leonardo da Vinci, wherein the grand style of chiaroscuro was effected, was struck by them, and endeavoured in future to imitate that character in his own pictures. If this be true, which is doubted by some, he, in adopting that style, did not scruple to vary it, to suit his own more pleasing taste; and certainly differs exceedingly from it in line, as much as in colour and effect. The former confines the eye almost to a single point, the latter diffuses the lights and shades; and though art be apparent, still nature more truly predominates.

He painted in fresco with great vigour and beauty, but little of his labour in that way now remains. He was engaged to paint the bridge of the Rialto in Venice, where he died altogether related: Vafari, while he praises the beauty of the colours and execution, condemns the work, as wanting sublimity. Many of his oil pictures are in this country, and they cannot be too much extolled for their excellence in character of colour, or fulness and freedom of handling; with a rich impasto, and a softness in the roundings, that render them delightfully pleasing to contemplate. One large picture of a Holy Family is in possession of the marquis of Stafford, which is highly honoured as to effect. But, perhaps the most perfect work of his in this country, is a small picture in the collection of the card of Carlisle, a portrait of Gablon de Foix, with a servant putting on his armour. We are not acquainted with any picture that has more truth or beauty of colour, and dryly of character to recommend it. His portraits, in general, have every excellence required in that interesting branch of the art, and he may be justly styled the father of portrait painting, as since handed down to us by Titian, Van dyke, and Sir Joshua Reynolds; the three great luminaries that have at different periods succeeded him. It is told of him, that having a dispute concerning the superiority of sculpture or painting; and it being argued, that sculpture had the advantage, because the figures it produces may be seen all around; he took the adverse side, maintaining that the necessity of moving, in order to see the different sides, deprived it of its superiority; whereas the whole figure might be viewed at one glance, in a minute. To prove his position, he painted a figure, and surrounded it with mirrors, in which all the various parts were exhibited, and obtained great applause for his ingenuity. He died of the plague, at the early age of 34, in the year 1511.

GIORGY, Sr., in Geography, a town of Schavonia; 16 miles N.N.W. of Verovitzia.

GIORNICO, called by the Germans Irrn, a town of Switzerland, in the Leventine valley, famous for the victory which 600 Swiss gained, in 1478, over the troops of the duke of Milan, amounting to 15,600 men; a victory which inspired to the Swiss an honourable and advantageous peace. In the vicinity of this town, there are many vineyards, and the walnut and chestnut trees are of a very large size, some of them being not less than 50 feet in girth; 13 miles N. of Bellinzona.

GIOSTALLI, a town of Africa, in the country of Multibbiil, at the bottom of a bay not far from Sofala.

GIOTTO, in Biography, a painter, conspicuous among those who revived the knowledge of the art in the 15th century. His father was a labourer, who lived at Vetignano, near Florence, and whose name was Bondoni; but he gave the name of Giotto to his son, who was born in 1276, and whom, at an early age, he placed with some shepherds to aid in tending their flocks. Whilst engaged in this employment, he was found by Cimabue drawing a sheep in the field with too much ingenuity, that that painter was induced to ask him of his father, that he might teach him the art of painting. In a short time he not only learned to imitate his master, but also to paint from nature; and, throwing off the dry Gothic manner which reigned till then, endeavoured to give the actual imitation of nature. He soon became far superior to his
GIOVANNI, in Geography, a town of Perugia, in the province of Kerman; 57 miles E. of Sigirian. — Alto, a town of Perugia, in the province of Farflla; 10 miles N. of Schiria.— Alto, a town of Perugia, in the province of Schierini; 55 miles W. N.W. of Zara. — GIOVANA, a town of the republic of Lucca; seven miles N. of Lucca. N. lat. 44°. E. long. 10° 40'.

GIOVANNI ASSANI, in Biography, a celebrated Italian opera singer, with a tenor voice. His first appearance on the stage was at the theatre royal at Copenhagen, where he remained three years. In 1772, he left and heard him at Hamburg, and in 1773 he went to Amsterdam, where, as well as at Hamburg, he only sung at concerts, there being no opera established in those cities at that time. In 1775 and 1776, he sung at Turin with the Aguiari. In 1777 at Naples with Rubinielli. In 1779 he arrived in England, where he found Roncaglia, who had possessed abilities, excited an ambition in the tenor singer to take the part of the soprano. Anfani had one of the best tenor voices we had ever heard on our opera stage. It was sweet, powerful, even, and of great compass and volatility. Nor could any defect be justly ascribed to it, except perhaps a little want of variety, spirit, and animation, in passing allegro, to distinguish joy from sorrow. For there was a natural melancholy and pathos in his tones on all occasions, which rendered his performance somewhat monotonous. He was of such a disinterested and irritable disposition, that "trifles light as air" occasioned perturbation. He and Roncaglia had been at variance in Italy, and here their enmity broke out anew, with double violence.

GIOVANI, St. in Geography, a town of Naples, in Capitanata; six miles N.E. of Acerno. — Alto, a town of the duchy of Carniola; two miles N.W. of Daino. — Alto, a town of Italy; 19 miles N. of Bergamo. — Alto, a town of Ifria; nine miles N.E. of Pola. — Alto, a town of Naples, in Abruzzi Ultra; 13 miles S. of Celano. — Alto, a town of Naples, in Baliciana; 17 miles S.W. of Matera. — Alto, a town of Italy, in the duchy of Piacenza; six miles W. of Piacenza. — Alto, a town of Etruria; 18 miles S.E. of Florence.

GIOVANNA, St. or St. John, an island in the Mediterranean. N. lat. 36° 27'. E. long. 26° 24'.

GIOVANNI RATTAC, St. a town of Naples, in Capitanata; 10 miles N.W. of Manfredonia.

GIOVAR, a town of Perugia, in the province of Farfllan; 55 miles S.S.W. of Schiria.

GIOVANNIO, a town of Cori; 25 miles E. of Corte.

GIOVENARIO, a town of Naples, in the province of Bari, situated near the sea, the seat of a bishop, containing four churches, four convents, and defended by a fort, and eight miles W. of Bari. N. lat. 41° 17'. E. long. 16° 43'.

GIOVI, a town of Etruria, on the Chieno; five miles N. of Arzno.

GIPPING, a river of England, in Suffolk, which joins the Orwell, and falls with it into the Stour.

GIPSIIES. See EGYPTIANS; under which article the reader will find an account of their supposed origin, migration,
Some of the people who have been frequently banished from various districts, and who have kept up their race, and carry on their trade of petty pilage and deception.

GIR, OR GIR, in Geography, a river of Africa, which Ptolemy delineates as equal in length to the Niger, the course of each being probably about 1300 British miles; but running from east to west, till it be left in the same lake, rent, and divided, the Nile, which for its Arabic geographer Edrih seems to indicate the river, when he speaks of the Nile of the Negroes, as running to the west, and left in an inland sea, in which was the isle Ulih. Some have supposed the Gir of Ptolemy to be the river of Borno, or Yel-al-Gaza, which joining another considerable river, flowing from Kuku, discharges itself into the Kubia Palus, or Kikina, and it is so delineated in Remondi's map; but others apprehend, seemingly with better reason, that the Gir of Ptolemy is the Bahir Kulla of Browne, in his history of Africa. This river, the Niles Nigir, as well as the Nile of Egypt, have their source in the mountains of Kumi, which Browne lays down in N. lat. 7. The banks of the river Kulla, according to this ingenious traveller's information, abound with pimento trees, and the ferry-boats are partly managed by poodles, partly by a double tar. The trees are so vigorous, from the quantity of water and deep clay, that canes are hallowed so large as to contain ten perches. Ptolemy seems to have described the first with the Gir, which falls river be clearly deduced from must have trive to be, i.e., to correspond with the Bahir Kulla, though he be a stranger to remote sources. This river is represented by Ptolemy as receiving two tributary streams from two lakes; and among other cities on its bank, is a metropolis called Girn. The termination of the Gir is not a little obscure, but it seems to be delineated, as passing under a chain of hills, on the N. of the Lybia Palus, or central lake of Africa, and afterwards joining the Niger in its course to the west. The Pangaon of Ptolemy, between the Gir and the Niger, may be the Wangoor of the Arabs; and his Lybia Palus, which forms the termination of the Niger eastward, seems to be mean, or Russell's observer, either for the larger of the lakes, or for the lake of that country (of which there are) collectively. From an accurate examination of Edrih, who wrote in Sicily in the 12th century, and who, from his minute attention to eastern Africa, has been called the Nubian geographer, it will appear, that this and the Nile of the Negroes, which he says runs to the west, has been mistaken for the Niger, he really knew nothing of that river; and his Nile of the Negro was the Gir of Ptolemy, terminating in an inland lake, in which was the island of Ulia, one day's sail from the mouth of the river; and in which island another Arabian geographer places the capital city of all Soudan. Beyond this island, Edrih appears to have had no knowledge of central Africa; all the regions and towns he mentions seeming to belong to the Gir, his Nile of the Negroes, running to the N.W.; and from his account it would appear that Wangoor is the Delta of the Gir.

GIR, in Botany, a species of grapes growing plentifully near Ras el Feed, on the borders of Abyssinia. It begins, says Mr. Bruce, to fruit in the end of April, and spread advances to its full height of about thirty feet during four months. It is ripe in the beginning of May, and days naturally fruit afterwards. This species of grapes was one of the acquisitions of our author's travels. It was not before known in Europe, nor when he published his work had the seed produced.
produced a plant any where but in the garden of the late French king.

GIRA, in Geography, a town of Persia, in the province of Mezanderan; 18 miles S. of Sari.
GIRAFE, in Ancient Geography, a metropolis of Libya interior, situated on the river G. Ptol. See GIR.
GIRAGLIA, in Geography, a small island near the N. coast of Corinthus, 23 miles N. of Bafila. N. lat. 43° 1' U. long 9° 56'..

GIRALDI, GIULIO GREGORIO, in Biography, one of the most learned men of his time, was born at Ferrara in the year 1489. He pursued his studies at his native place, and having attained to considerable eminence in the language he was chosen by the countess Rangrone as successor to her son Hercules, afterwards a cardinal. He accompanied the countess to Rome during the pontificate of Leo X., and had apartments assigned him at the Vatican. He appears to have been employed in the instruction of various young persons in polite literature, and continued at Rome during the two next pontificates. He enjoyed but a slender pension of health, and at the close of Rome he lost all his property, and even his books. This was the year 1552, when, having lost his friend and patron the cardinal Rangone, he was obliged to leave the capital. In his dilations, which was very fierce, he composed for Carna, and for Mucedola, where he met with a very kind friend in Giovanni Pico. This patron was murdered in 1553, and Giraldi with great difficulty escaped to Ferrara with his life. His poverty was now extreme, but he was not without friends, by whose liberality, especially that of the duchess Renata, he was enabled to lay up a store for the future. He died, after a life of much torture, in the year 1552. So varied was his life, and severe his afflictions, that towards the close of life he complained that he had always to combat against three enemies, Nature, Fortune, and Injustice. His great work was entitled “Syntagma de Dii Gentium.” This is the first treatise in which mythology is discussed in a truly learned manner, and it is a treatise which exhibits the vail extent of the author’s reading, and for which the learned world is under very great obligations. He was author of several other treatises, “On the Muses;” “The Life of Hercules;” “Explanations of the Pythagorical Symbols;” and other ancient enigmas: “A Treatise of Years and Months, with Greek and Latin Calendars, and thirty Dialogues on subjects of Turkefs and Persians;” “A History of the Greek and Latin Poets,” and of “The Poets of his own Time.” He was a considerable Latin poet, and it is thought a few of his own misfortunes induced him to write two small pieces against ingratitude, entitled “Progymnasmata adversus litteras et litteratos.”

Morei.

GIRALDUS, SILVESTRE, CAMBRENIS, one of the most learned and eloquent divines of his time, was born near Pembroke, in South Wales, 1145. Among his numerous works that have been preserved, printed and manuscript, we shall here only advert to an extraordinary passage relative to music, in his “Cambria D.criptio, cap. X.” which has been lately quoted by musical writers, and on which great stress has been laid by Eximeno (Dobbio sopra il Faggio fond. post. di contrap. di L. Martini) and by Mr. Ed. Jones, Mod. Recits of the Welsh Bards.

After all the enquiries that we have made concerning the origin and antiquity of counterpoint, or music in parts, the passage to which we have allude surprized us extremely. Many ecclesiastical historians tell us that the organ was first admitted into the church at Rome by pope Vitalian, 666, the same pontiff who two years after sent fitters into Kent, to finish the work which Autius, the first Roman millenarian, had begun. In 680, according to Bede, John, the preceptor of St. Peter’s in Rome, was sent over by pope Aga-tho to instruct the monks of Weremouth in the manner of performing the ritual, who opened fchools there and in other places of the kingdom of Northumberland for teaching music.

This may, perhaps, reconcile to probability some part of the following account, which Giraldus Cambrenis gives of the peculiar manner of singing that was practiced by the Welsh, and the inhabitants of the north of England, about the end of the twelfth century.

“Th Britons,” says he, “do not sing in union, like the inhabitants of other countries; but in many different parts. So that when a company of singers among the common people meets to sing, as is usual in this country, as many different parts are heard as there are performers, who all at length unite in conformation, with organic sweetness. In the northern parts of Great Britain, beyond the Humber, on the borders of Yorkshire, the inhabitants use the same kind of symphonious harmony; except that they only sing in two parts, the one murmuring in the base, and the other warbling in the acute or treble. Nor do these two nations practice this kind of singing so much by art as habit, which has rendered it so natural to them, that neither in Wales, where they sing in many parts, nor in the north of England, where they sing in two parts, is a simple melody ever well sung. And, what is still more wonderful, their children, as soon as they attempt using their voices, sing in the same manner. But as not all the English sing in this manner, but those only of the north, I believe they had this art at first, like their language, from the Danes and Norwegians, who used frequently to invade and to occupy, for a long time together, those parts of the island.”

This extraordinary passage requires a comment. And first, it may be necessary, before we reason upon the circumstances it contains, to be certain of their authenticity. Giraldus Cambrenis is indeed an author who has been often suppos’d inaccurate and fabulous; and the glaring improbabilities in the above account, with the manifest ignorance of the subject in question, by no means contribute to augment his credibility. For whoever is acquainted with the laws of counterpoint, or with the first difficulties attending the art of singing in parts, can not exalt the idea of the harmony of an untaught crowd, turbæ cantuum, or suppose it to be much better than the dissonant peals of a good-humoured mob; in which the parts would be as various as the pitch of voices of which their chorus was composed. But how all these united at last in the conformation of organic melody, and the soft sweetnefs of B mollis, will long remain an impenetrable secret:

“As true no meaning puzzles more than wit.”

With respect to what he afferts of the people in Northumberland singing in two parts, it is more reconcilable to probability, from the circumstances just mentioned, of the cultivation of music in that part of the world under Roman mallets, who may probably have first brought over the art of diatant, or double singing, which the newly invented organ had suggested, by the facility it afforded of founding two or more notes at a time; which art, when practic'd by voices, was thence called organum, organizans. But as to what Giraldus says of children naturally singing in this manner as soon as they were out of the cradle, the reader will afford it what degree of weight he pleases; but for
our own part, we must own that it is not yet admitted into our musical creed.

GIRAN, in Geography, a town of Algiers, anciently called Arinsa; 45 miles S.E. of Oran.

GIRANA, a town of Abyssinia; 60 miles N.W. of Gonder. N. lat. 13 °. E. long. 36° 37'.

GIRANDOLE, a large kind of branched candlestick. See Branch and Jessi.

GIRAIPA TRA, in Geography, a town of the island of Candy; 16 miles S.W. of Sattia.

GIRAR, a fortress of Hindostan, in Malwa; 40 miles S.W. of Chandernagore. N. lat. 24° 24'. E. long. 79° 18'.

GIRARD, Gabriel, in Biography, a distinguished member of the French academy, known as the author of a work entitled "Symphonies Françoises," the object of which is to prove that the French words, usually accounted synonymous, have, almost all, certain shades of difference, which, in correct speech, should prevent them from being used indiscriminately. No grammatical work was ever better received by the public, and it was the opinion of Voltaire that it will suffice as long as the language. This work has been imitated in English, in one entitled "The difference between words esteemed synonymous in the English language, and the proper choice of them determined," in two vols. 12mo. 1766. The abbé Girard also wrote a French grammar, entitled "Princes de la Langue Françoise," which has much merit in its plan and theory, but is thought very defective in point of style.

GIRARDON, Francis, an eminent sculptor, intended by his father, who was a founder, for the profession of the law. His inclination for the fine arts could not be controlled, and he was educated as an artist. He was brought up at Troyes, but having acquired much reputation and practice there, he went to Paris to improve his taste and judgment under the sculptor Anguier. His performances obtained for him a high degree of reputation; he was noticed by the king, and by him lent with a liberal pension to Rome. In 1657 he was admitted into the academy, and was patronized by Le Brun. Girardon is reckoned to have had more correctives than invention; and he is said to have modelled with more facility than he worked in marble. His principal works are, four figures composing the group of the bath of Apollo, and the cape of Proserpine in the gardens of Verailles; the equilibrant statue of Lewis XIV. and the mausoleum of cardinals Richelieu, in the church of the Sorbonne. He cultivated the friendship of the fine writers of the age, several of whom have done honour to his merits and memory. He was nominated to the chancellorship of the academy in 1695. After having adorned the capital and many other parts of the kingdom with a number of works, and risen to the very head of his profession, he died in 1715 at the age of eighty-five. Moret.

GIRBE, in Geography, a town of Egypt, on the right bank of the Nile; 26 miles N. of Syene.

GIRBEH, a river of Switzerland, which runs into the Aar, two miles S. of Berne.

GIRCH, a river of North Wales, which runs into the sea, near Pwllheli, Caernarvonshire.

GIRCHSBECK, a town of the duchy of Holstein; six miles W.S.W. of Oldenbrooke.

GIRZENI, a town of Moldavia; 50 miles N.N.E. of Galatz.

GIRDERS, or Girning beams, in Carpentry, are those large beams thrown across a room, in order to shorten the bearing of the joists.

When the bearing is not very great, the girder consists of a single beam; when it is more than common, the bundle, or piece of wood out of which the girder is made, is fawn down the middle, and the two pieces are reversed and bolted. In great buildings the girder is framed like the principals of a roof, for the construction of which we refer our reader to the articles Carpentry, and Naked Flooring.

No girder ought to be less than ten inches in the wall, nor ought they, or any principal beam, to be placed over an aperture. They ought to be of the most hearty wood, and as free of knots as possible; for knots depress the continuity of the fibres, and consequently impair the strength.

GIRDING-GIRT, in Sea Language. The seamen say a ship is girt, or hath a girding-girt, when her cable is so tight or strained, that upon the running of the tide she cannot go over it with her stern part, but will lie across the tide.

GIRDLE, Cingulus, or Zone, a belt or band of leather, or other matter tied about the loins, to keep the part more firm and tight.

It was anciently the custom for bankrupts, and other insolvent debtors, to put off and furrander their girdle in open court. The reason was, that our ancestors used to carry all the necessary utensils, as purse, keys, &c. tied to the girdle: whence the girdle became a symbol of the estate. History relates, that the widow of Philip I. duke of Burgundy, renounced her right of inheritance by putting off her girdle upon the duke's tomb. Accordingly the girdle among the ancients was used for a purse. Our Saviour forbids His apostles to carry money in their girdles. Matt. xii. 9. Haggai, i. 6. Horace says, that he who has lost his girdle (his money) is ready for anything. "Ibit có quo vis, qui zonam perdedit." Hor. Ep. I. ii. c. 1. The Romans always wore a girdle to tack up the turcica, when they had occasion to do any thing; this custom was so general, that such as went without girdles, and let their gowns hang loose, were reputed idle, dissolute persons.

GIRDLE, Mirad' or Virginia'. It was the custom among the Greeks and Romans for the husband to unite his wife's girdle. Homer, lib. xi. of his Odysseus, calls the girdle cphysarm, zygem, mird's girdle. Feuich relates, that it was made of sheep's wool, and that the husband united it to bed; he adds, that it was tied in the Hercules knot; and that the husband untied it, as a happy presage of his having as many children as Hercules, who, at his death, left seventy-nine behind him.

The poets attribute to Venus a particular kind of girdle, called effer, to which they annexed a faculty of inspiring the passion of love. See Ester, Quicksilver, in Medicis; is a sort of girdle smeared over with mercury, or having mercury inclosed within it. It is made of leather, linen, cloth, cotton, stuff, or the like; and the mercury is prepared or killed various ways; as with falling spittle, fat, or the like.

It is applied as a topical medicine about the waist, sometimes with good effect; but frequently it proves dangerous, principally in weak constitutions, and those subject to convulsions. Its intention is, the cure of the itch, driving away vermin, killing lice, &c.

GIRDLE, Queen's, is an ancient duty or tax, raised a Paris every three years, at the rate of three deniers upon each midiat of wine, and fixed for each quantity: it was intended for the maintenance of the queen's household: afterwards they augmented and extended it to other commodities, as coals, &c.

Vignere supposed it to have been originally thus called, because the girdle anciently served for a purse; but he adds, that a like tax had been raised in Paris, and under the same name, above two thousand years ago; it appears from Platos, in his Philostrat. Cietto, Athenian. &c.
GIRLIE, Christians of the. Motawakkil, tenth caliph of the family of the Abassides, enjoined the Christians and Jews, in the year of the Hegira 235, of Jesus Christ 856, to wear a large leathern girdle, as a badge of their profession; which they wore to this day throughout the East, from which time the Christians of Asia, and particularly those of Syria and Mesopotamia, who are almost all Nestorians or Jacobites, have been called "Christians of the girdle."

GIRLIE, Order of the, the order of Cordeliers. See Cord and Cordeliere.

GIRLIE, in Architecture. See Cincture.

GIRLIE, among Jewellers, the line which compasses the stone parallel to the horizon; or, which determines the greatest horizontal expansion of the stone.

GIRLIE Wheel, a small spinning-wheel, made for hanging to a woman's girdle or apron-string, so that the may spin with it though walking about.

GIRLIE, in Mining, is the name used in Cumberland, and some other counties, to denote the uncertain strata, or chance beds, of stones and different substances that are met with in some districts; which, instead of occupying the whole space, of the same or nearly an equal thicknes throughout, are only local, preferring, however, contantly the same relative situation to that of the strata, wherever they appear; that, is, they are peculiar to particular places in the series of strata, and known, according to the numerous enquiries and observations which Mr. Farey, Sen., has made on these anomalous masses in the stratification, to be peculiar in their shape, always ending insensibly or with sharp-edges on all sides, like extremely flattened nodules; and, except in shape and size, and their rarity, he conjectures that they differ nothing from the nodules which are so very common in particular strata, as of iron-flour in the beds and strata of most coal-fields, and in the grit-flours of stone; those of pyrites in many coal-frames, those of the nodules of flint in the upper chalk strata, &c. &c. Particular strata in the British strata are found to be subject to these chance beds, or strata, within their mass; some of which large nodular masses afford a confusely crystallized structure, and seem to occasion large hills and even mountainous tracts, as Charnwood Forest, in Leicestershire, whose white and slate, &c. have been referred, by the gentlemen named above, to the anomalous manner of growth or marble strata, &c. See Philosophical Magazine, vol. xxxii. page 40.

GIRDINESS, in Geography, a cape on the E. coast of Scotland. N. lat. 57° 4' W. long. 2° 2'.

GIRELLI, Agulare, in Biography, a female opera singer, who arrived here the fame seconious Miller, in 1772. Her style of singing was good, but her voice was in decay, and her intonation frequently falte, if she arrived here; however, it was easy to imagine from what remained, that she had been better. She remained here only one season, and was succeeded by Miss Cecilia Davies.

GIREST, in Geography, a town of Periss in Ker- men; 100 miles E.N.E. of Gomran.

GIRET, a town of Periss, in Mazanderan; 30 miles S. of Fuhirabad.

GIRGASHITES, in Scripture Geography. See Ge-

GIRGE, the capital of Upper Egypt; and the re-

GIRGITZA, in Geography, a town of Walachia; 40

GIRKIN, among Gardeners. See Guerkin.

GIRLE, or Gyule, among Sportsmen, denotes the roe-

GIRMANO,
GIRMANO, in Geography, a town of Prussia, in Samland; 25 miles N.W. of Königsberg.

GIROMAGNY, a town of France, in the department of the Upper Rhine, and chief place of a canton, in the district of Besfert. The place contains 1700, and the canton 9752 inhabitants, on a territory of 150 kilometres, in 19 communes.

GIRONDE, in Geography, a learned Spanish prelate, who flourished towards the close of the 16th century, was born at Talavera. In the course of his studies he had paid a marked attention to philosophy and theology; to history and the councils, with which he became intimately conversant. He lived in a retired way as a canon, till his uncle resigned to him the archdeaconry of Guadalajara, which is one of the dignities belonging to the church of that city. In 1585, Philip II., king of Spain, sent for him to court, made him master of the royal chapel and almoner; and likewise entrusted to his care the education of his son Philip, infant of Spain. In 1596, Cardinal Albert assumed the government of the Low Countries, and appointed Gironde his delegate over the archbishopric of Toledo; to which valuable see he was himself afterwards preferred. He died in 1599, and his death has been imputed to the chagrin which he felt for the neglect shown him by his pupil, who had lately succeeded to the throne. He was author of a valuable collection of Spanish councils, under the title of "Collectio Conciliorum Hispaniae, cum Notis et Emendationibus." Moreri.

Giron, in Geography, town of Africa, on the ivory coast.—Also, a town of S. America, in the province of Quito; 25 miles S. of Cuenca.

Girou, or Girons, in Heraldry, denotes a triangular figure having a long sharp point, not unlike a wedge, terminating in the centre of the effeteleon.

The word is French, and literally signifies the giroum or leap; because, in letting, the knees being supplexed somewhat abender, the two thighs, together with a line imagined to pass from one knee to the other, form a figure somewhat similar to this.

When a coat has fix, eight, or ten of these girons, meeting or centering in the middle of the coat, it is said to be girons or girons.

GIRONDE, in Geography, a river of France, formed by the union of the Garonne and Dordogne; 12 miles N. of Bourdeaux, which runs into the Atlantic, after a course of about 275 miles N. N. W.

Gironde, one of the nine departments of the south-west, or Garonne region of France, deriving its name from the river Gironde. It is a metropolitan department, comprised of a portion of Guienne, in N. lat. 44° 40', and bounded on the N. E. by the department of the Lower Charente, on the E. by the departments of the Dordogne and Lot and Garonne, on the S. by the department of the Landes, and on the W. by the sea. Its capital is Bourdeaux. This department contains 11,270 kilometres, or about 573 square leagues, and 519,685 inhabitants, and is divided into six districts: viz. Blaye, comprehending 4 cantons, 61 communes, and 52,066 inhabitants; Libourne, including 9 cantons, 143 communes, and 125,576 inhabitants; La Reole, comprising 6 cantons, 118 communes, and 53,705 inhabitants; Bazas, containing 7 cantons, 68 communes, and 47,549 inhabitants; Bourdeaux, comprehending 18 cantons, 153 communes, and 233,021 inhabitants; and Lépinac, containing 4 cantons, 37 communes, and 30,868 inhabitants. Its contributions amount to 5,553,653 francs, and the expenses for administration, justice, and public instruction to 533,564 francs. The soil of this department is various: the east and northeast districts are the most fertile. In the valley between Agen and Bourdeaux, the soil, though light, is of an excellent quality. The west and south-west districts are sandy, marshy, and barren, or indifferently fruitful. The products of the soil are grain, hemp, delicious wine and fruits, pastures, considerable forests of pines, slime quarries, mineral springs, &c.

GINONELLA, a town of Spain, in Catalonia; 7 miles E. N. E. of Solsona.

GIRONNE. See Gerona.

GRONS, St. a town of France, and principal place of a district, in the department of the Arriège; 21 miles W. of Tarascon. N. lat. 42° 59'. E. long. 1° 13'. The place contains 2504, and the canton 13,083 inhabitants, on a territory of 2873 kilometres, in 16 communes.

GROST, a town of Perla, in the province of Kennera; 123 miles S. of Sarjon.

GIRROCK, in Hebrew, the common English name of the fish called the Lacerus, a large species of garfish, caught in the Mediterranean and English seas.

GIRONNILE, GIRONY, in Heraldry, is, when a shield or coat is divided into several girons, which are alternately colour and metal.

When there are eight pieces, or girons, it is absolutely said to be gironné: when there are more, or fewer, the number is to be expressed: gironné of four, of fourteen, &c.

Some, instead of gironné, say, parti, coupé, tranché, and tailles, because the girons are formed by such divisions of the field. Four girons form a faltier, and eight a crois.

GIRT, in measuring timber, is used for the circumference of a tree. See Coggehull's Sliding rule and Demometer.

Some call the fourth part of the circumference the girt, and supposo the square of this equal to the area of the section of the tree.

GIRT, in Architecture, the same with fillet. See Fillet.

Girt, girdle, in Sea Language. See Girding-girt.

Girt-line is a rope passing through a single block, on the head of the lower mails, to hold up the rigging thereof: this is the first rope employed to rig a ship, and by means of this all the rest are drawn up and fixed; after which it is removed till the ship is to be unrigged.

GIRTHS of a Saddle, the long straps, made of a canvas stuff called girth-web, which being buckled under the horse's belly, serve to fix the saddle.

GIRTIN, Thomas, in Biography, a draftsman of uncommon capacity, who lately adorned our days, and if he had not been cut off by an early death, would probably have exhibited unrivalled talents in the peculiar branch of the art he adopted. He was born in 1775, and was one of those who have contributed to raise almost a new species of art by the use of water-colours in landscape painting. He drew with a ready hand, in a style entirely his own, and with great taste and effect; though not always with a strict adherence to truth. He died of consumption, brought on by irregularity, at the early age of 27.

GIRU, in Geography, a town of Perla, in the province of Mazandran; 5 miles E. of Tehrabad.

GIVAN, a sea-port of Scotland, in the county of Ayr, situated at the mouth of the river Givan, which rises in the N. E. part of the county, and runs into the sea a little below the town. It has a commodious harbour, capable of great improvement. The chief employment of this town, which is a burgh of barony, governed by bailies and councillors, annually elected, is weaving of cotton and woollen cloths. In 1801 the number of inhabitants was 226, of whom 1360 were employed in trade and manufactures. The
neighbourhood abounds with limestone and coal; 21 miles S S W. of Ay.

N. lat. 55 18'; W. long. 4 44'.

GISHARM, or GUISARMES, in our Old Writers, an habi-
tobert or hand-ax: it comes from the Latin bas armas, because it
wounds on both sides. Sene.` "El armorium genus longo manubiro et perretta curisipide." It is mentioned in the itinare 1 Edw. I. cap. 6.

GISBOROUGH, in Geography, a market town and
parish in the North Riding of the county of York, is seated
near the mouth of the river Tees, 8 miles from Stockley,
and 248 from London. By the population returns, printed
by order of parliament in 1801, this parish contains 383
houses and 1719 inhabitants. In the time of King James I.
the same alum mines were discovered here, and were worked
for several years with great success. The bay at the mouth
of the Tees forms a commodious harbour. In this town
was formerly a spacious monastery, of which some consider-
able ruins remain. Here are a weekly market on Friday,
and five annual fairs.

GISCALA, in Scripture Geography, a town of the tribe
of Asher, in Lower Galilee; S E of Jotapa.

GISEKJA, in Botany, named by Linnaeus in honour of
his pupil Dr. Paul Dietric Giiseke, professor of Natural
History at Hamburg, and editor of the Predicaciones in Ordens
Naturalis Plantarum, compiled from his own notes and those
of Fabriacus, taken from the mouth of Linnæus, and pub-
Sp. Pl. v. 1. 1547. Mart. Mill. Dict. v. 2. Juss. 315. La-
naric Haftr. t. 221. (Kreuterea; Marr. Comm. Nov.
Geett. v. 3. 37. t. 2. f. 1.)—Clas and order, Pentandria

Gen. Ch. Col. Perianth of five ovate, concave, obtuse,
leaves long, with membranaceous edges. Cor. none. Stam.
Filamentus five short, awl-shaped, ovate at the bafe; anthers
roundish. Pist. Germin superior, roundish, retuse, deeply
five-lobed; styles five, short, recurved; stigma obtuse.
Peric. Capsules five, roundish, slightly compressed, rough,
obtuse, close together, each of one cell. Seed solitary, ovate,
smooth.

Spec. Ch. Calvin of five leaves. Corolla none. Capsules
five, approximated, roundish, singed-feaded.

1. G. pharnacoides. Linn. Mant. 562. Native of the
East-Indies. A smooth annual herb, with the aspect of an
Illecebrum or Pharmacum. The flera are prostrate, a foot
or two in length, narrowed along their upper side, alternately
branched. Leaves opposite, stalked, obovate, entire, light
green, rather hairly. Flowers small, green, in little axillary
umbels. Fruit blackish. On the short axillary branches, the
leaves, as Jullien well observes, are opposite. No other
species has been discovered.

GISELO, in Geography, an island on the E side of the
gulf of Bodnia. N. lat. 61 40'; E. long. 21 22'.

GISGI, a town of Transylvania, near the Maros; 14
miles S W of Milbenbach.

GISHI, a town of Georgia, in the province of Kaketi;
15 miles S E of Telish.

GISHUBEL, a town of Bohemia, in the circle of
Königgratz; 20 miles E N E of Königratz.

GISING, a town and castle of Hungary; 14 miles
S W of Steinam-Anger.

GISIO, a town of Sweden, in Angermanland, on the
Gidsa; 16 miles W. of Nordmalling.

GISLAVY, a town of Sweden, in the province of Sma-
land; 40 miles S. W. of Jönköping.

GISON, or Gerard, in the Jewish Antiquities, a little
wall about broad high, made round the temple properly so
called, and the altar of burnt sacrifices, to keep the people
at a distance. Josephus, in his Book of Antiquities, makes
it to be three cubits high; and but one, in his History of the
Jewish war. J. Antiq. lib. vii. cap 2 p. 262. et de

GISORS, in Geography, a town of France, in the depa-
partment of the Eure, and chief place of a canton, in the
district of Les Andelys; 27 miles N E of Evreux.
The place contains 3500, and the canton 9246 inhabitants, on
a territory of 1474 square kilometres, in 23 communes. N. lat.
49 17'; E. long. 2 50'.

GISINGHEIM, a town of Germany, in the county of
Wertheim; 15 miles S of Wertheim.

GISANT, a town of Spain, in Arragon, situated on a
bridge in the Pyrenées, on the confines of France, having
in its vicinity mines of cobalt; 15 miles N. of Alfa.

GISTO, a small island in the Adriatic. N. lat. 44 36'.
E. long. 14 51'.

GISUND, a town of Norway, in the diocese of
Drethom; 24 miles N W of Drontheim.

GITAGO, in Botany, a name used by some authors,
particularly by Fluyt, for the lollum or darnel-grass.

GITI, in Geography, a town of Thibet; 334 miles N E
of Delhi. N. lat. 32 10'. E. long. 79 50'.

GISVOUR, a town of Mocampour; 47 miles S W
of Macampour.

GITSCHIN, a town of Bohemia, in the circle of
Königgratz; 22 miles N W of Königsgratz. N. lat. 50
E. long. 15 20'.

GITTITH. This word occurs frequently in the Pslams,
and is generally transliterated give-thee. The conjectures
of interpreters are various concerning this word gittith. Some
think it signifies a sort of musical instrument; others, that
the Psalms, with this title, were sung after the vintage;
Lastly, others, that the hymns of this kind were invented
in the city of Gath. Cabnet is rather of opinion, that it
was given to the class of young women, or songgirls of
Gath, to be sung by them. (P. vii. i. xxxii. 1. iv.) Dr.
Hammond thinks that the Psalms, with this title, were all
set to the same tune, and made on Goliah the Gittite.

GIVA, in Geography, a town of Asoitic Turkey, in
Natalia; 52 miles S E of Miles.

GIVAROTONDO, a town of Naples, in Capitanata;
9 miles W of Monte Carlo.

GIVEL, a small island near the south coast of Sar-
dinia. N. lat. 27 18'; E. long. 9 3'.

GIUDUCCA, L. A., or ZUCCA, one of the islands
adjoining to the city of Venice, which is said to owe its
name to the Jews, who formerly resided there. It contains
10 churches, 4 monasteries, and as many nunneries.

GIVEN, DATUM, a term very frequently used in Mat-
hematics, signifying a thing which is supposed to be known.
Thus, if a magnitude be known, or we can find another
equal to it, we say, it is a given magnitude, or that such a
thing is given in magnitude.

If the position of any thing be supposed as known, we
say, given in position.

Thus, if a circle be actually described on a plane, its cen-
tre is given in position, its circumference given in magnitude,
and the circle is given both in position and magnitude.
A circle may be given in magnitude only; as when only
its diameter is given, and the circle not actually described.
If the kind or species of any figure be given, they say,
given in species. If a ratio between any two quantities is
given, they are said to be given in proportion. See DATA.

GIVET, in Geography, a town of France, in the depar-
tment of the Ardennes, and chief place of a canton, in the
district of Rocroy; 15 miles N E of Rocroy. N. lat. 50 7'.
E. long.
GIU

E. long. 4° 51'. The place contains 3335, and the canton
8445 inhabitants, on a territory of 130 kilometres, in 20
communes.

GIUF, LA, a district of Arabia, in the province of
Nejd; E. of mount Ramleh.

GIULA, a town of Hungary, situated on the river
Keres; 52 miles N. N. W. of Temesvar. N. lat. 46° 35'.
E. long. 20° 55'.

GIULAB, a town of Asia, Turkey, in the govern-
ment of Diarbekir; 18 miles N. N. E. of Ourfa.

GIULENI, a small island in the Gulf of Bari; 130
miles S. of Afrachan. N. lat. 44° 15'. E. long. 42° 49'.

GIULLA TROVA, a town of Naples, in Abruzzo Ultra,
on the coast of the Adriatic; 12 miles E. N. E. of Ta-
naro.

GIULIA, St. a town of France, in the department of the
Stura; 12 miles S.S.W. of Acqui.

GIULIANO, St. a mountain of Etruria, near Pisa, at
the foot of which are warm baths, known in the time of
Phily.—Alfo, a town of Naples, in Capitanata; 9 miles
W.S.W. of Dragedora.—Alfo, a town of Naples, in the
county of Molife; 13 miles S.S.E. of Molife.—Alfo, a
town of Naples, in the province of Otranto; 17 miles
S.S.W. of Brindif. —Alfo, a town of Italy, in the de-
partment of the Olona; 7 miles S.E. of Milan.

GIVORS, a town of France, in the department of the
Rhone, and chief place of a canton, in the district of Lyon;
12 miles S. of Lyon. The place contains 5200, and the
canton 15,550 inhabitants, on a territory of 95 kilometres,
in 18 communes.

GIVRY, a town of France, in the department of the
Saone and Loire, and chief place of a canton, in the district
of Chalons-sur-Saone; 4 miles W. of it. N. lat. 49° 47'.
E. long. 4° 52'. The place contains 2582, and the canton
11,145 inhabitants, on a territory of 132½ kilometres, in
13 communes.

GIUSEPPE APRIE, See TENDUCCI.

GIUSEPPE ARNA, in Biography, an able composer of Ne-
apes, whose ftyle had much of the accomplishment of that school.
In 1741 he fet the fermano drama of Tigrane, written by
Goldoni, to music, for the great theatre of St. John Chry-
sotom, at Venice, which eiftablished his character.

GIUSMARK, in Geography, a town of Curdiuf; 80
miles S.S.E. of Bafis.

GIUSTENDIL, a town of European Turkey, in Bul-
garia; 24 miles S. of Sofia.

GIUSTINELLI, in Biography, a second-rate Italian
finger in foprano, arrived here, in 1762, with De Amicis
and her family, as fhril fanous in the burletta operas.
He had a good voice, and sufficient merit to supply the place
of fectand fan on our Hage, in the ffage operas, for feveral
years after.

GIUSTINIANI, AUGUSTIN, was born at Genoa
1470, was educated for the church, and in 1514
was made bishop of Nebbio in Corsica. He published, in
1516, a Pflifer in four languages, viz. the Hebrew, Greek,
Arabic, and Chaldee, with interpretations: this was the firfl
of the Polyglot editions of the books of Scripture. After
this, he was invited by Francis I. to Paris, and appointed to
the professorship of the Oriental languages in that university,
an office which he held about five years. During this period
he received a pension from the crown, and was enabled to
collect a very choice library, which he afterwards prefered to
the republic of Genoa. In the year 1536, in passing by
sea to his bishoprie, he was lost with his ship. The prelate
revived and edited the treatife written by Porcheri, entitled
"Victoria adversius impios Judaeos." Some time after his
death, were published his "Annals of the Republic of Ge-
no," from the foundation of the city, to the year 1528: this
work is highly efteemed for its information, and for the
veracity of the facts. Moreri.

GIUSTINIANI, BERNARD, a Venetian nobleman, born in
1468, was educated under the most learned persons of his
time, and obtained a very celebrated for his own knowledge
and eloquence. He was employed on several honourable oc-
casions by the republic. In 1451 he was appointed to re-
cord the emperor Frederic III. when he passed through the
Venetian territories. He was afterwards selected as a lit per-
fone to be sent on embaylly to Ferdinand, king of Naples, to
several of the papacy, and to Lewis XI. king of France,
who honoured him with knighthood. In 1467 he was made
captain commandant of Padua, and admitted to almost all
the honors of the state, and finally procurator of St. Mark.
He died in 1486. He was author of many works: as pub-
lic orations: the life of his uncle "The bleffed Lorenzo
Giustiniani," three pieces on the life, the translation, and
the appearance of St. Mark: a version of the book of Socrates
in Nicoleon; some Latin letters of his father Leonardo;
and the ancient history of Venice, written in Latin. This
last was translated into Italian by Lodov. Domenichi. It
was the work of his old age, but is highly efteemed, because
the authorities are drawn from the best sources, and the au-
thor rejects the fables handed down by some other writers.
Moreri.

GIZE', GIZAH, or JIZA, in Geography, a considerable
town of Egypt, extending along the well bank of the Nile, on
the other side of the island of Roskada, or Raonda, with respect
to Cairo; 3 miles S.W. of Cairo. This town was fortified by
Ibnai Bey, who also built a palace there, completed and fin-
ished by Murad Bey, who has established a very famous
foundery. Here is also a manufacturer of fial ammoniac.
The walls of Giza are of great extent, and have only one gate to
the country; they are ten feet high, three feet thick, and
have five half-moons; but are only fit to repel cavalry, the
original intention in raising them. Murad Bey has suffered
the iron-work about the loop-holes to be plundered or ruined.
The palace is in the southern quarter of the city, close to the
water; it has numerous apartments for the Mamluks, and
every convenience for ease or luxury. Murad Bey has, of
late years, thought it necessary to institute a marine; having
purchased some vessels of the Europeans, and built three or
four others. The largest of these vessels carries 24 guns: those
which are occasionally moored before Gize cannot be navigat-
ed, except during the time of the Nile's increafe. The mariners
are chiefly Greeks of the Archipelago. Not far north of Gize
is "Geziret-el-ahab," a small island, which Diodorus Siculus denominated "Venus Aurea." N. E. of the city are gardens, and some spacious houses, oc-
cupied by the affluent and great, who occasionally leave the
city to amuse themselves in this retreat; and they have there
an open space where the Mamluks perform their military
evolutions, and exercise their horses. The ground under the
mountains to the east is filled with tombs. The moun-
tain is of white sand and calcareous flone, and dellinated
of verdure. The numerous date-trees by which Gize is sur-
rounded, interperfered with the lofty turrets of the mosques,
and the river, whose waves wash the very foundation of the
houses, give it, at a distance, a very pleasing appearance. Dr.
Shaw is of opinion, that the ancient Memphis flood on the
site of Gize; but this is disputed by Savary and others.
(See MEMPHIS.) This is the nearest spot, fays Semm, to
the most valuable monuments which ancient Egypt has left
behind of her glory and her power. The nearest pyramids
are at the distance of three leagues, and they are indifferi-
nately
It is chiefly in writing for Conti and Anibali that the conformity to a different style from his own appears.

Domenico Anibali, who should have had an article in the letter A, had he been remembered, shall be characterized here, in apology for the omission. His first air in the opera of "Armindo," in which he performed with Conti and the Strada, discovers his voice to have been a contralto, which Handel gave him an opportunity to display by a fault, _ad libitum_, at the beginning; but no peculiar taste, expression, or powers of execution, appear in his part; his bravura air in the second act, _Si caddi_, contains only common and easy passages. His abilities during his stay in England seem to have made no deep impression, as we never remember him to have been mentioned by those who constantly attended the operas of those times, and were raptures in speaking of the pleasure which they had received from fingers of the first clas. But to return to Conti, who, after he quitted England, studied with such diligence, that being engaged at Madrid to sing in the operas under the direction of Farinelli, he turned the tables on that wondrous finger, in whom it has been said, that he excited envy by his new and refined taste and pathos.

He was one of the constellation of great fingers which the king of Portugal had assembled together in 1755.

There were, according to Paccini's account, Elifl, Manzoli, Caffarelli, Gizziello, Veroli, Bobbi, Luciani, Raaf, Raina, and Guadagni. No females were then allowed to appear on the opera stage in Portugal. Gizziello, narrowly escaping with his life during the dreadful earthquake which happened at Lisbon that year, was impressed with such religious turn by that tremendous calamity, that he retired to his monastery, where he ended his days. It was soon after this event, that Guadagni first himself up in the fame convent not so much for spiritual consolation as musical counsel; which he so effectually obtained from the friendship of Gizziello, that from a young and wild finger of the second and third clas, he became, in many respects, the first finger of his time.

GLABALX, in Geography, a town of France, in the department of the Dyle, and chief place of a canton, in the district of Louvain. The place contains 239, and the canton 6771 inhabitants, on a territory of 120 kilometres, in 19 communes.

GLABELLA, in Anatomy, from gras, smooth: the space between the two eye-brows, which is ordinarily not covered with hairs.

GLABER, in Biography, a Benedictine monk, who flourished in the 11th century, and who has rendered his name memorable by a "Chronicle or History of France," written in the Latin language. It consists of five books, of which the first relates to the events of the monarchy previous to Hugh Capet, and the four subsequent ones to those following it, as far down as the year 1046. This work is distinctive as a composition, and, at the same time, full of fabulous stories, yet it contains much valuable information relative to those remote ages. He was author of a life of William, abbot of St. Benignus at Dijon. Morei.


Gum. Ch. Col. Perrinaths inferior, of one leaf, tubular half as long as the corollas, cut half way down into five equal lobes.
obtuse, broadish teeth. Cor. Petals five, lanceolate, obtuse, equal. Nectary surrounding the germen, and consisting of five oval-shaped, crept, coloured bodies, the length of the calyx. Stam. Filaments thirty, capillary, the length of the calyx, united by their base into five parcels of fix filaments each, ranged alternately with the nectaries; anthers kidney-shaped. Pjfl. Germen superior, nearly globular, four-foled; style thread-shaped, as long as the filaments; stigma fimple. Peric. according to Rumphius, a mucilaginous drupa, of one cell, containing a hard oval nut.


1. G. tofo. Linn. Mant. 276. (Lignum lave minus; Rumph. Amb. v. 3. 71. t. 44.) Native of the lofty and close woods of Amboyna. Rumphius describes and figures two kinds of this Lignum lave, very similar to each other, nor does it appear on what authority Linnæus adopted one as a synonym in preference to the other. The specimens in his herbarium have flender leafy branches, with a smooth greyish bark. Leaves alternate, on short thick stalks, ovato-lanceolate, pointed, entire, three or four inches long, very smooth and shining above; pale grey beneath, as if hoary, but they are rather clothed with a fibrous grey skin, minutely dotted all over, which soon leaves the rib and veins. Species none. Flower-stalks axillary and terminal, branched irregularly, the partial ones somewhat umbellate, all clothed, as well as the calyx, with minute umbilicated ruffly scales, exactly like those on the leaves and flowers of the Druis; see that article. The flowers are small. Fruits, according to Rumphius, an aromatic black drupa, the size of a pea, flanding on the permanent calyx.

If the Druis belongs to Malaces, we are persuaded this genus must likewise be placed in that order, but otherwise we should have had no such idea, nor does the fruit confirm it. The light fibrous silky nature of the wood, which while wet is close, but has large fissures when exposed to the sun, favours our supposition.

GLACIALIS. Icy, of glacier, ice, something relating to ice; and particularly a place that abounds in ice.

Thus we say, the Marc Glacialis, or Congelation, that is, the Icy or Frozen sea; called also the Chronian or Sarman- tian sea.

GLACIERS, a denomination applied to large sheets or fields of ice among the Alps, and which are numerous in Switzerland and Savoy. Of these there are five, that stretch towards the plain of Chamouny, and unite at the foot of Mont Blanc; they are called Tacoma, Botons, Montanvent, Argentiere, and Tour. The origin of these glaciers, extending into fields of corn and pasture, and lying, without being melted, in a situation where the heat of the sun is powerful enough to bring vegetation to maturity, is a very curious subject of investigation. Mr. C. C. has given us an abstract of the theory of Grauner, with regard to their formation, and other particulars respecting them, confirmed and amended by that able naturalist Saulure; which appears, upon the whole, to be the most simple and natural. If a person, says this interesting traveller, could be conveyed to such an elevation as to embrace, at one view, the Alps of Switzerland, Savoy, and Dauphiné, he would behold a vast chaos of mountains, intersected by numerous vallies, and composed of many parallel chains, the highest occupying the centre, and the others gradually diminishing in proportion to their distance. The most elevated, or central chain, would appear bristled with pointed rocks, and covered, even in summer, with ice and snow, in all parts that are not perpendicular. On each side of this chain he would discover deep vallies clothed with verdure, peopled with innumerable villages, and watered by many rivers. In considering these objects with greater attention, he would remark, that the central chain is composed of elevated peaks and diverging ridges, whose summits are overgrown from the snow; that the declivities of the peaks and ridges, excepting those parts that are extremely steep, are covered with snow and ice, and that the intermediate depths and spaces between are filled with immense fields of ice, terminating in those cultivated vallies which border the great chain. In purifying this general survey, and moreover observing that the branches most contiguous to the central chain would present the same phenomena, only in a lesser degree, the glaciers would be obviously divided into two forts; the first occupying the deep vallies situated in the bosom of the Alps, and termed by the natives \textquoteleft Valles de Glace,\textquoteright distinguished by Mr. C. C. by the name of \textquoteleft Lower Glaciers:\textquoteright the second, which clothe summits and sides of the mountains, are denominated \textquoteleft Upper Glaciers.\textquoteright The former are much the most considerable in extent and depth. Some stretch several leagues; that of Des Bois in particular is more than 15 miles long, and above three in its greatest breadth. These lower glaciers do not communicate with one another, and few of them are parallel to the central chain. They mostly stretch in a transverse direction, being bordered at the higher extremity by inaccessible rocks, and on the other side extending into the cultivated vallies. Saulure found the general depth of the ice in the glacier des Bois from 80 to 100 feet; but there is reason to believe that its thickness in some places exceeds even 600 feet. These immense fields of ice usually rest on an inclined plane being pushed forwards by the pressure of their own weight, and weakly supported by the rugged rocks beneath, they are intersected by large transverse chains, and present the appearance of walls, pyramids, and other fantastic shapes, observed at all heights and in all situations, wherever the declivity exceeds 30 or 40 degrees. But in those parts where the plane on which they rest is nearly horizontal, or genteel inclined, the surface of the ice is nearly uniform; the chaflensfs are few and narrow, and they are crooked without much difficulty. The surface of the ice is less slippery than that of ponds or rivers; it is rough and granulated, and only dangerous to those who pass it in deep defcents. It is not transparent, is very porous, and full of small bubbles, and is of course less compact than common ice. Its perfect resemblance to the congelation of snow impregnated with water, in opacity, roughness, and the number as well as smallness of the air-bubbles, led Saulure to conceive the following simple and natural theory concerning the formation of the glaciers. An immense quantity of snow continually accumulates in the elevated vallies enclosed within the Alps, as well from that which falls from the clouds during nine months in the year, as from the mafles incessantly rolling from the steep sides of the circumjacent mountains. Part of this snow, not diffused during summer, impregnated with rain and snow-water, is frozen during winter, and forms that opaque and porous ice of which the \textquoteleft Lower Glaciers\textquoteright are composed. The \textquoteleft Upper Glaciers\textquoteright may be subdivided into those which cover the summits, and thole which extend along the sides of the Alps. The former owe their origin to the snow that falls at all seasons of the year, and which remains nearly in its primitive state, being compelled into a hard subsistance, and not converted into ice. The subsistance which cloths the sides of the Alps is neither pure snow, like that of the summits, nor ice which forms the Lower Glaciers, but an assemblage of both. It contains less snow than the summits, because the summer heat
has more power to dissolve it, and because the liquefied
flow descending from above, swells absorbs a larger
quantity of water. It contains more snow than the Lower
Glaciers, because the dilution of the snow is com-para-
tively less. Hence the ice is even more porous, opaque, less
compact than that of the Lower Glaciers, and of so doub-
ted a texture, as renders it, in many parts, difficult to
decide, whether it may be called ice or frozen snow. In a
word, there is a regular gradation from the snow on the
summits to the ice of the Lower Glaciers, formed by the
intermediate mixture, which becomes more compact and less
porous in proportion as it approaches the Lower Glaciers,
until it unites and affinitizes with them. And it is evident,
that the greater or lesser degree of density is derived from
the greater or lesser quantity of water, with which the mas
is impregnated.

It has been a contested point among naturalists, whether
the glaciers are in a state of increase or diminution. The
following observations may be alleged in proof of the lat-ter
alternative. In 1785, the interior ice of Grindelwald
was diminished at least 400 yards since the year 1776; in
the valley of Chamouny, the glacier called "les marmilles de
glace," from their resemblance to walls, and which rise in
very thick, foli'd, parallel ranges to a height of 150, or, as
some say, 400 feet above their real bed, and forming the
border of the glacier of Ballon, no longer existed, and
young trees had shot up in the parts which were there-fore
covered by the glaciers of Montanvert. The advocates for
the increase of the glaciers, notwithstanding these facts, appli-
cable, as they say, to the lower regions, assert, both from theo-
ry and observation, that more snow falls, and more ice is an-
ually formed in the Alps than can be annually dissoluted.
From theory they argue, that the cold occasioned by the mas
of ice already formed ought to augment it still further: and
from experience they deduce, that within the remembrance
of the present generation, many mountains have been cover-
ed, many pastures and habitations invaded, and many pas-
fages irrecoverably obstructed by the ice. In reply to the
argument from theory it is maintained, that the causes which
lead to the diminution of the ice are no less powerful than the
augmentation of the cold, which is first supposed to occur in
indistinct incursions, and finally invade and fix in the ele-
avated regions, evaporation, defacement of the snow and ice,
both precipitations and gradual heat of the atmosphere,
and mean temperature of the earth, which is always
above the freezing point, as is evident from the heat of
the springs which issue from the bowels of the earth. With
regard to the argument derived from experience, it is thought
sufficient to observe, that while the facts that prove the pro-
gress of the ice are admitted, it by no means seems to fol-
low, that its mass is perpetually increasing. For the ad-
vocates of this opinion, while they scrupulously enumerate the
places which have been invaded by the ice, do not take no-
tice of those parts, no less numerous, from which the ice
has receded. Upon the whole we have reason to conclude,
that if the collection of ice and snow gains in some places, it
is diminished in others, and that, upon an average, the ag-
gregate quantity is nearly the same. Cocks's Travels in
Switzerland, vol. ii.

GLACIES MARITI. See Specularis Lapidis.

GLACIS, in Building, an easy imperceptible slope or decliv-
ity. The defect or inclination of the glacis is less steep
than that of the talus. In gardening a defect sometimes
begins in talus, and ends in glacis.

The glacis of the corniche is an easy imperceptible slope in
the cymatium of the corniche, to promote the defect and
drain off the rain-water.

GLACIERS, in Fortification, is particularly used for that of
the covert-way, being a sloping bank, which reaches from
the parapet of the covert-way, or covert-way, to the level
side of the field, at the distance of about twenty
fathoms.

The construction of the covert-way and glacis is more dif-
tinctly illustrated in Plate V. Fortification, fig. 6. When
the body of the place, and all the necessary out-works are
constructed, lines are drawn parallel to the outermost con-
terforcas of the ditches, at six toises distant from it; and
the space m n m, included between that line and the con-
terforca, will be the covert-way required. If lines are
drawn parallel to the lines which terminate the covert-way,
and the places of arms m n, &c. at twenty toises distant
from them, the space x y z between these lines will be the
glacis. A, in this figure, represents the arrow: B, the
detached redoubt; e, the travelles; z, the sally-
ports. When the ground is low, and water to be found,
there is often a ditch of about ten or twelve toises made round
the glacis; beyond which there is a second covert-way of four
toises, with travelles and places of arms, and a final glacis
from fifteen to eighteen toises broad. Muller's Fort. p. 42.
See Military Construction.

GLADBACK, or GLADBACH, in Geography, a town of
Germany, in the circle of Wellphalia, and duchy of Juliers; 16 miles N. of Juliers. N. lat. 51° 14'. E. long.
6° 15'.

GLADDON, or GLADWIN, the name of a plant, other-
wise called fpargewort.

GLADE, in Agriculture, Gardening, &c. a villa, or
open and light passage made through a thick wood, grove,
or the like, by lopping off the branches of trees along the
way.

GLADE, in Zoology. See Glad.

GLADENBACH, in Geography, a town of Germany,
in the principality of Upper Hesse; 12 miles N. of Gie-
ßen.

GLADIATORS, in Antiquity, persons who were re-
tained to fight ordinarlly in the arena, for the entertain-
ment of the people.

The gladiators were usually slaves, and condemned crimi-
inals, who fought from necessity; though, sometimes, free-
men made profession of this practice, like our prize-fighters,
for a livelihood. After a slave had served on the arena three
years, he was dismiffed.

The Romans borrowed this cruel diversion from the Asis-
tics: some suppose that there was policy in this practice,
the frequent combats of gladiators tending to accustom the
people to despise danger and death.

The origin of such combats seems to be as follows: From
the earliest times with which we have any acquaintance with
profane history, it had been the custom to sacrifice captives,
or prisoners of war, to the names of the great men who had died
in the engagement; thus Achilles, in the Iliad, b. xxiii.
sacrifices twelve young Trojans to the names of Patroclus;
and in Virgil, lib. x. ver. 81. Aeäus leads captives to
Evaier, to be sacrificed at the funeral of his son
Pallas.

In course of time they came also to sacrifice slaves at the
funerals of all persons of condition; this was even effec-
ted a necessary part of the ceremony: but, as it would have
appeared barbarous to have sacrificed them like beasts,
they were appointed to fight with each other, and endeavore
to save their own lives by killing their adversaries. This
seemed somewhat less inhuman, because there was a possi-
Bility of avoiding death by an exertion of skill and
courage.

This
This occasioned the profession of gladiator to become an art; hence arose masters of arms, and men learned to fight and exercise this art.

These masters, whom the Latins called lanista, bought slaves to be trained up to this cruel trade, whom they afterwards sold to such as had occasion to present the people with so horrible a show.

They were at first performed near the sepulchre of the deceased, or about the funeral pile, but were afterwards removed to the circus and amphitheatres, and became public spectacles. See BUSTUARIUS.

The first show of gladiators, called manus gladiatorum, was exhibited at Rome, according to Valerian Maximus, by M. and D. Brutus, upon the death of their father, in the year of the city 483; though Livy (ix. 40) speaks of it in the 444th year of Rome, as practiced among the Campanians. On the exhibition by M. and D. Brutus, there were probably only three pairs of gladiators; in the year of Rome 537, the three sons of M. Emilius Lepidus the augur, who had been three times confidé, entreated the people with the cruel pleasure of seeing twenty-two gladiators fight in the forum; and the show continued three days. In the year of Rome 541, the first Africanus diverted his army at New Carthage with a show of gladiators, which he exhibited in honour of his father and uncle, who had begun the reduction of Spain. In the 452d year the sons of M. Valerius Laevinus exhibited 25 pairs of gladiators; and in 569, 75, and in 578, 74 fought on the like occasion. In process of time, the Romans became so fond of these bloody entertainments, that not only the heirs of any great and rich citizen lately deceased, but all the principal magistrates, pretented the people with shows of this nature, to procure their affections. The divi, pretors, consuls, and, above all, the candidates for offices, made their court to the people, by entertaining them frequently with these fights: and the priës were sometimes the exhibitors of the barbarous shows; for we meet with the ludi pontifices in Suetonius, August. cap. 44, and with the ludi sacrorum, in Pliny, Epit. lib. viii. As for the emperors, it was so much their interest to gratify themselves with the populace, that they obliged them with combats of gladiators almost upon all occasions, and as they increáed, the number of combatants increáed likewise. Accordingly, Julius Caesar, in his adlocutio, diverted the people with three hundred and twenty couple; Gordian, before he was emperor, gave these shows twelve times in a year. In some of these there were 500 pairs of gladiators, and never less than 50.

Germanicus and Claudius, both sons of Drusus, gave combats of gladiators in honour of their father. Nero's and Domitian's combats of gladiators are noticed in the sequel of this article. Otho employed 2000 gladiators in the war against Vitellius (A.D. 69), and Vitellius hired gladiators to fight in all the streets of Rome for the amusement of the people. The inhuman fights of gladiators, though long authorized by custom, afforded no pleasure to Vestal. Titus, however, exhibited a show of gladiators, wild beasts, and representations of sea-fights, which lasted a hundred days; and Trajan continued a solemnity of this nature for a hundred and twenty-three days, during which time he brought out ten thousand gladiators. And Adrian, on his first visit to Rome, after his promotion to the empire, gave combats of gladiators for six days successively. Before this time, under the republic, the number of gladiators was so great, that when the conspiracy of Catiline broke out, the senate ordered them to be dierated into the garrison and secured, lest they should have joined the disaffected party. See GLADIATORS' War.

Thefe sports were become so common, and their consequences, in a variety of respects, so dangerous, that Cicero preferred a law, that no person should exhibit a show of gladiators within two years before he appeared candidate for any office. Julius Caesar ordered, that only a certain number of men of this profession should be in Rome at a time. Augustus decreed, that only two shows of gladiators should be presented in a year, and never above sixty couple of combatants in a show. And Titus provided by an order of council, that no person should have the privilege of gratifying the people with such a solemnity, unless he was worth four hundred thousand sestertii. They were also considerably regulated by Nerva.

The emperor Claudius restrained them to certain occasions; but he soon afterwards annulled what he decreed, and private persons began to exhibit them at pleasure, as usual: and some carried the brutal satisfaction so far, as to have them at their ordinary feasts.

And not slaves only, but other persons, would hire themselves to this infamous office.

The matter of the gladiators made them all first swear, that they would fight to death: and if they failed, they were put to death, either by fire, or swords, clubs, whips, or the like.

It was a crime for the wretches to complain when they were wounded, or ask for death, or seek to avoid it, when overcome; but it was usual for the emperor, or the people, to grant them life, when they gave no signs of fear, but waited the fatal stroke with courage and intrepidity: Augustus even decreed, that it should always be granted them. But fear and want of spirit were very rare on occasions of this kind; infomuch, that Cicero more than once propounds the principle of honour which actuated the gladiators as an admirable model of courage and constancy; by which he intended to animate himself and others, to suffer every thing for the preservation of liberty and the defence of the commonwealth. (Tusc. ii. 44, Philip. ii. 35.)

From slaves and freedmen, the inhuman sport at length spread to people of rank and condition; so that Augustus was obliged to issue a public edict, that none of the senatorian order should become gladiators: and soon after he laid the same restraint on the knights; nevertheless, Nero is related to have brought upwards of four hundred fenators, and six hundred Roman knights upon the arena; though Lupus takes both those numbers to be falsified, and, not without reason, reduces them to forty fenators, and sixty knights. Not only fenators, but even women of quality, bought in public in one of Nero's combats of gladiators. On occasion of the triumph of Probus, A. D. 281, about four-score gladiators, together with near 600 others, exhibited the most desperate courage, for the inhuman sports of the amphitheatre. Dismaying their blood for the amusement of the populace, they killed their keepers, broke from the place of their confinement, and filled the streets of Rome with blood and confusion. After an obstinate resistance, they were overpowered and cut in pieces by the regular forces; but they obtained at least an honourable death, and the satisfaction of a just revenge (Zosimus, l. i. p. 66.); yet Domitian, that other monster of cruelty, refined upon Nero, exhibiting combats of women in the night-time.

Before Rome was become the capital of the known world, Antiochus Epiphanes, king of Syria, in imitation of the Romans, had introduced the combats of gladiators in his dominions. It is remarkable, however, that the Athenians, who were naturally beneficent and humane,
GLADIATORS.

never admitted bloody shows into their city: and when it was proposed to establish combats of gladiators there, in order not to give place to that respect to the Corinthians, "Vide Juv.," exclaimed an Athenian in the midst of the assembly, whose name was Demoxus, a famous philosopher, who flourished in the reign of Marcus Aurelius, "the altar which our forefathers above a thousand years ago erected to Mercury."

Some Pagan emperors, lamenting the bad effects of this savage custom, endeavoured, as we have already seen, to moderate it. With this view Marcus Aurelius restrained the enormous expenses employed in these combats, and would not suffer the gladiators to fight with each other, except with very blunt swords, like foils; so that they might throw their address, without any danger of being killed. But the honour of suppressing these combats was reserved for Christianity; and it cost many efforts and much time to effect this purpose. So rooted was the evil, and so much had it established itself by the long prescription of many ages, and the opinion of the world, that these combats were acceptable to the gods, to whom, for that reason, they offered the blood of gladiators lately shed, by way of sacrifice, as several of the Christian fathers observe.

Constantine the Great is said to have first prohibited the combats of gladiators in the East; at least, he forbade those who were condemned to death for their crimes to be employed; there being an order still extant to the prefects pretorii, rather to send them to work in the mines in lieu thereof; it is dated at Berytus, in Phoenicia, the 11th of October, 325.

But, notwithstanding this edict, which condemned the art and amusements of shedding human blood, the heinous law expressed the wishes of the prince, without reforming an inveterate abuse, which degraded a civilized nation below the condition of savage cannibals. Several hundred, perhaps several thousand, victims were annually slaughtered in the great cities of the empire; and the month of December, more peculiarly devoted to the combats of gladiators, still exhibited to the eyes of the human people a grateful spectacle of blood and cruelty. Amidst the general joy of the victory at Pollentia, gained by the emperor Honorius, Prudentius, a Christian poet, exhorted the emperor to extirpate, by his authority, the horrid custom which had so long inflicted the voice of humanity and religion. The pathetic representations of Prudentius were less effectual than the generous boldness of Telenachus, an Asiatic monk, whose death was more useful to mankind than his life. The Romans were provoked by the interruption of their pleasures; and the rash monk, who had defended into the arena, to separate the gladiators, was overwhelmed under a shower of stones. But the madness of the people soon subsided; they respected the memory of Telenachus, who had defied the honours of martyrdom; and they submitted, without a murmur, to the laws of Honorius, which abolished for ever the inhuman sacrifices of the amphitheatre. The citizens, who adhered to the manners of their ancestors, might perhaps intimate, that the last remains of a martial spirit were preserved in this school of fortitude, which accustomed the Romans to the sight of blood, and to the contempt of death—a vain and cruel prejudice, so foolishlyconfirmed by the value of ancient Greece, and of modern Europe.

It must be observed, however, that the practice was not entirely abolished in the West before Theodoric, King of the Ostrogoths. Honorius, on the occasion first mentioned, had prohibited them; but the prohibition does not seem to have been executed. Theodoric, in the year 526, abolished them finally.

Some time before the day of battle, the person who presented the people with the shows gave them notice thereof, by programmes, or bills, containing the names of the gladiators, and the marks whereby they were to be distinguished; for each had his formal badge, which was, most commonly, a peacock's feather, as appears, from the Scholia of Juvener, on the 15th verse of the third Satire, and Tuirnebus Adver. lib. ii. cap. 8.

They also gave notice what time the shows would last, and how many couples of gladiators there were; and it even appears, from the 53d verse of the seventh Satire of the second book of Horace, that they sometimes made representations of these things in painting, as is practiced among us by those who have any thing to show at faire.

The day being come, they began the entertainments by bringing two kinds of weapons: the first were flaves, or wooden files, called rudes; and the second were effective weapons, as swords, poniards, &c.

The first were called arma laesio, or excercitatoria; the second decreatoria, as being given by decree or sentence of the prator, or of him at whose expense the spectacle was exhibited. They began to fence or skirmish with the first, which was to be the prelude to the battle; and from these, when well warmed, they advanced to the second, at the sound of the trumpets, with which they fought naked.

Then they were said vertere arma; the terms of flinking were petere and petere; of avoiding a blow, elire; and when one of the combatants received a remarkable wound, his adversary or the people cried out, habes, or habes.

The first part of the engagement was called ventilate, praelirter; and the second, dimicari ad victoriam, or vertere arma fregare; and some authors think, with much probability, that it is to these two kinds of combat that St. Paul alludes, in the passage 1 Cor. iv. 26, 27. "I fight, not as one that heareth the air; but I keep my body, and bring it into subjection."

If the vanquished surrendered his arms, it was not in the victor's power to grant him life; it was the people during the time of the republic, and the prince or people during the time of the empire, that were alone empowered to grant the boon.

The reward of the conqueror was a branch of palm-tree, and a sum of money; probably collected among the spectators; sometimes they gave him his congé, or dismissed him, by putting one of the wooden foils or rudi in his hand; and sometimes they even gave him his freedom, putting the plumes on his head.

The sign or indication whereby the spectators showed that they granted the favour, was fretum pollicium, which M. Dacier takes to be a clenching of the fingers of both hands between one another, and holding the two thumbs upright, close together; and, when they would have the combat finished, and the vanquished slain, they verterunt pollicium, bent back the thumb; which we learn from Juvenal, Sat. iii. ver. 36.

"Munera nume edunt, et verfo pollicie vulgi Quemlibet occident populariter." Juv.

The gladiators challenged or defied each other, by flewing the little finger; and, by extending this, or some other, during the combat, they own themselves vanquished, and beggred mercy from the people: *Vidit odenan digiti vertit um populo polliciabatur," says the old Sclavish on Per-


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GLA


There were divers kinds of gladiators, distinguished by their weapons, manner, and time of fighting, &c. &c.

The andabates, of whom we have already given an account under ANDABATE.

The caturarii, who always fought in troops or companies, number against number; or according to others, who fought promiscuously, without any certain order.

Lip. Saturn. lib. ii. cap. 16.

The conumbrati, whom authors mention as a species of gladiators, the fame with the radulirii and veteranii; founding the opinion on a passage in Pliny, lib. viii. cap. 7. But Lippius shews, that they have maltreated Pliny. Saturn. lib. ii. cap. 16. and Turneb. Advers. lib. xxx. cap. 36.

The cubicularii, which are a little precarious, being chiefly founded on a passage in Lampadius, in the life of the emperor Commodus: "Inter hæc, habuit victimæm, victimas immolavit, in arena rudibus, inter cubicularios; gladiatores pugnavit lucentibus aliquando murmuros."

Turnebus reads radulirii instead of cubicularius; and understands it of those who had been dismembered, and could no longer be obliged to fight, except with foils.

Salmianus reads gladiator; and refers it to the emperor, who fought not only on the arena, and with foils, or blunted instruments, but at home, with his servants and valets de chambre, and with sharpers.

Lippius will have nothing altered in the text: <the gladiatores cubicularii> he observes, were those who fought at private houses, during feasts, &c. &c.

Accordingly, Dion says, that the Commodus sometimes fought at home, and even killed some persons in such recreations; but that, in public, he only fought with blunted weapons.

The dimaches, who fought armed with two poniards, or swords; or with sword or dagger. Lip. Saturn. lib. ii. cap. 13.

The effedaris, who fought in cars; called also, in an inscription lately discovered at Lyons, affedaris. Saturn. ferm. lib. ii. cap. 12.

The fistasles, or Cesariani, who belonged to the emperor's company; and who, being more robust and dexterous than the reff, were frequently called for, and therefore named allo popolatitii. Saturn. lib. ii. cap. 16.

The other kinds were, the kaplmachii, meridiani, myrmidones, ordinaries, pinutras, provocatores, retardil, radulirii, Sammites, sectores, fpedidores, and Turvani: which see described under Meridiani, Rettaihi, Sectores, &c.

Some authors, and particularly Vigeniere on Livy, rank the obsequentes, mentioned by Spartan, in his life of Marcus Aurelius, among the number of gladiators; Lippius ridicules him. Saturn. lib. ii. cap. 12. and with some reason: the obsequenter properly were the troops which that emperor raised among the gladiators; or whom of gladiators he made foldiers.

GLADIATORS' war, bellum Gladiatororum, or Spartacianum, called also the slave war, was a war which the Romans sustained about the year of their city 680. Spartanus, Oenoas, having escaped with other gladiators, to the number of seventy-four, out of the place where they had been kept at Capua, gathered together a body of slaves, put themselves at their head, rendered themselves masters of all Campania, and gained several victories over the Roman pretors. At length they were defeated, in the year 682, at the extremity of Italy; having, in vain, attempted to pass over into Sicily.

This war proved very formidable to the Romans.

Crasius was not able to subdue it: the great Pompey was forced to be sent as general.

GLADIATOR, dying, is a most valuable monument of ancient sculpture, which is now preserved in the palace of Cligeti. This man, when he had received the mortal stroke, is particularly careful, ut pacentur homines, that he might fall gracefully; he is seated in a reclining posture on the ground, and has just strength sufficient to support himself on his right arm; and in his expiring moments, it is plainly seen that he does not abandon himself to grief and dejection, but is solicitous to maintain that firmness of aspect, which the gladiators valued themselves on preferring in this scene of danger, and that attitude which they had learnt of the matters of defence. His fears not death, nor seems to betray any tokens of fear by his countenance, nor to fixed one tear; "quis mediciosis gladiators ingenuit, quis victum mutavit unquam, quis non modo detexit, verum etiam decubuit turpiter," says Cicero, in that part of his Tusculan, where he is describing the astonishing firmness of these persons. We fee, in this instance, notwithstanding his remaining strength, that he has but a moment to live, and we view him with attention, that we may fee him expire and fall: thus the ancients knew how to animate marble, and to give it almost every expression of life.

GLADIOLE, in Beny. See Butomus and Lobelia.


Gen. Ch. Cal. Spatha inferior, shorter than the corolla, of two oblong permanent valves; the outermost larger, enclosing the inner one. Cor. of one petal, superior; tube cylindrical, swelling upwards, curved; limb somewhat bell-shaped, irregular, in fixed deep, oblong, slightly spreading, unequal segments, the upper and lowermost either without or within the lateral ones. Stam. Filaments three, inserted into the mouth of the tube, thread-shaped, ascending, shorter than the corolla; anthers ovate, incumbent. Pelt. Germ. inferior, triangular; style thread-shaped; stigma three, spreading, folded, recurved, obtuse, downy. Peric. Capsule ovate, triangular, obtuse, thin, of three cells and three valves. Seeds numerous, smooth, surrounded with a membranous wing.


Twelve-four species of this genus are defined in the 14th edition of Linnæus's Systema Naturæ, of which the rume- tus pull, Sp. Pl. 53, belongs, we believe, to Asia, or some of its near allies. Willdenow makes 50 species, but Mr. Ker (late Gawler) has, we think, with great propriety, established the old genus Ixionitis, to which none of them are removed; while others go to his Tritonia or eliwhare, so that he names but 28 species in Sims and Konig's Annals above quoted. He is followed by Mr. Dryander in the new edition of the Hortus Kewensis, except with regard to his hirsutus, there called hirsutius, after Willdenow and Jacquin; while a most distinct species figured in Curt. Mag. t. 574, by Mr. Ker as a variety of hirsutus, is properly retained as being the true hirsutus itself. Five of Mr. Ker's species are not found in Hort. Kew.

We judge it necessary to give a view of the whole genus in
GLADIOLUS.

its reformed fate, adding the Linnean G. inbriecus to what the above-mentioned writers have defined.

1. **G. Convallaris.** Curt. t. 51. (Antholyza Convallaria; Linna. Sp. Pl. 54. Vahl. Enum. v. 2. 121. Curt. Mag. t. 345. Redout. Lil. t. 12.)—Leaves linear-fork-shaped. Upper segment of the corolla very long; lower very small. Native of the Cape of Good Hope, nor does it appear to grow, as Linneus asserts, in Peru. Removable for the vivid heart of its fragrant and beautiful flowers, the three upper segments of whole corolla are broadly elliptical and vultured, the middlemost projecting far beyond the other two; while the three lower are very small, and greenish. This is a hardy green-house plant. See Antholyza, n. 3.


3. **G. quadrangulata.** Ker in Curt. Mag. t. 567. (G. abbreviata; Andr. Repof. t. 166. Antholyza quadrangularis.) Bayl. Fl. Cap. According to Mr. Ker, “Leaves with four angles and four furrows. Upper segment of the corolla very long; lower very small and sharp.”—Imported from the Cape of Good Hope, by those excellent cultivators Meffrs. Lee and Kennedy in 1799. It first flowered with them in March 1801. The quadrangular leaves distinguish this from most others, except the trifflis, n. 10, and formabilis, n. 7; the flowers more agree with G. Convallaria, at least in their large vaulted upper segment, but all the lateral segments are extremely short, obtuse and acute, the lowermost being the leaf of all. The tube is yellow streaked with orange; large segment of the limb purplish; all the rest variegated with dull green and brown. According to the Linnean idea of hybrid species, this might be classified to have originated from G. Convallaria impregnated by G. trifflis.

4. **G. galactus.** Andr. Repof. t. 122. (G. nanaqueinis; Ker in Curt. Mag. t. 552.)—Upper segment of the corolla vaulted; two lateral rhomboids; three lower pendulous, flatulate, blunt with a little point. Leaves coriaceous, ovate. Native of the Namby country, a confiderable distance from the Cape of Good Hope; easily propagated by seeds or offsets, and blooming freely. The leaves are very thick, many-rhribed, obovate, obtuse, curved or oblique. Stem low, bent or zig-zag, covered with bracteas and flowers. The latter are large and flowy, their three narrow dropping lower segments, each half green half scarlet, strikingly contrasted with the large broad upper ones, which are of a rich scarlet, green white and purple at the base. No authority can induce us to prefer such a specific name as nanaqueinis, it being contrary to rule as the name of a country, and to peculiar barbarous in style. The G. galactus of Jacquin is Sparrman galata of Ker.

5. **G. albus.** Linna. Sp. Pl. 53. Herb. Linna. Andr. Repof. t. 8. Ker in Curt. Mag. t. 586.—Upper segment of the corolla obvolute, recurved; two lateral rhomboids; three lower pendulous, flatulate, pointed. Leaves rigid, lanceolate. Common about the Cape of Good Hope; easily encrusted by leaves or bulbs, but rarely flowering with us. Bears a considerable resemblance to the last in form and colors, but the leaves are narrower and very differently shaped, the lower segments of the corolla more lanceolate, the upper one reflexed. Linneus once called this species lobalis, but his son changed it to albus, in allusion to the wing-like lateral segments.

6. **G. virens.** Ker in Curt. Mag. t. 688. (G. albus; Jacq. Inc. Rat. t. 259. G. ochridiflorus; Andr. Repof. t. 241.)—Upper segment of the corolla flatulate, arched, incurved; two lateral rhomboids; three lower flatulate, pendulous, acute. Leaves straight, linear-fork-shaped. Native of the Cape; rare in our collections. Plinnet's rude figure, t. 224. f. 8, is supposed to belong to this species rather than to the last, for which it is quoted by Linneaus. This differs from the two preceding in having long erect narrow leaves, and flowers variegated with dull green and purple, which are luciously fragrant. The stem is tall, and sometimes branched.

7. **G. penduliflorus.** De la Roche Diff. t. 27. t. 2. Ker in Ann. of Bot. v. 1. 121.—Leaves awl-shaped, quadrangular, erect. Upper segment of the corolla broadest, vaulted, undulated; two lateral narrow-rhomboid; three lower flatulate, acute, recurved at the points. Native of the Cape of Good Hope. We know it only by De la Roche's figure and description. He says the flowers are of a very pale violet, diluted with purple and yellow. The name alludes to their being pervious between the segments, but this is not peculiar. That fpposed variety of trifflis, figured by Jacquin, Inc. Rat. t. 244, seems to be very near the present species.

8. **G. varfoeder.** Ker in Curt. Mag. t. 1642 and 564. Andr. Repof. t. 19.—Leaves linear-fork-shaped, with three ribs on each side. Segments of the corolla longer than the tube, pointed, recurved.—Native of the Cape, from whence it was received by Meffrs. Lee and Kennedy in 1794. Its flowers are among the largest of its genus, with peculiar long undulated recurved segments, and are remarkable for changing colour several days successively. In the morning it is of a purplish brown, but becomes grey in the course of the day, and finally of a light blue in the evening. The most wonderful, and, as far as we know, unique circumstance is, that the original brown hue returns in the course of the night, and this happens for nine or ten following days. There are moreover some varieties of colour observable in different plants, some assuming more of a yellow hue. It differs essentially from the following in having a fork-shaped, not a quadrangular, keel.

9. **G. trifflis.** Linna. Sp. Pl. 53. Ker in Curt. Mag. t. 272. t. 158. Inc. Rat. t. 245 and 244. (Liliajgladiolus bifolius et bivlorus, folis quadrangulis; Trew. Ebrct. t. 39.)—Leaves with four angles and four furrows. Segments of the corolla nearly equal, pointed.—Frequent at the Cape, and not uncommon in our green-houses, where it is jufly admired for its rich evening scent, like a pink, or a bergamot pear, especially in the most common or partly-colored variety, to which the first-quoted figures of Curtis and Jacquin refer. The deeply furrowed quadrangular leaves, like those of the Snake's head Iris, tuberosa, distinguish it clearly from the last, for which Mr. Ker, we presume by mistake, quotes Jacquin's t. 245. He likewise cites and blames Trevis Ehret as the yellowish variety, which is a fine plate, though rather too pink, of the particoloured one.

10. **G. hyalinas.** Jacq. Inc. Rat. t. 242. Ker in Ann. of Bot. v. 1 t. 231. Willd. Sp. Pl. v. 2. 211.—Leaves linear, erect, the length of their joints. Segments of the corolla ovate, acute; the uppermost largest, erect.—Native of the Cape. Jacquin says it flowered with him in December. We do not find it in the Hortus Kewensis, but Hortus Curtius.
GLADIOLUS.

Cantabrigiensis, nor have we seen any specimen. The short, upright, filiform leaves are remarkable. The flowers are smaller than in the two last, scented; the base of their segments semi-transparent, the extremities yellowish, slightly rippled and dotted with purple. The upper segment is by far the largest; the others gradually smaller, to the lower one, which is leaf of all. Tube funnel-shaped, semi-elliptical, very pale purple, as long as the largest segment. —Jacquin first called this species *fritizi* : see Collect. v. 4. 170.

11. G. tenellus. Jacq. C. R. t. 248. Coll. v. 3. 255; and v. 4. 169, t. 3. 1. Ker in Ann. of Bot. v. 1. 231.—Leaves linear, convoluted, smooth. Stem zig-zag. Segments of the corolla elliptical, bluish, nearly equal, shorter than the tube. Native of the Cape. Jacquin, from whole figures alone we are acquainted with this plant, says it bloomed with him in November. The stem is a spath high, curved and zig-zag. Flowers one or two, yellowish, more or less variegated with pale purple, slender, about an inch and half long.

12. G. fimbriatus. Thunb. Diff. 18. Linn. Suppl. 96. Ker in Ann. of Bot. v. 1. 231 —"Leaves linear-brilliate-shaped, Corolla ringent. Stem bracted." —Native of the Cape of Good Hope. "Stem bearing many spikes of flowers; very rarely simple; upright, somewhat zig-zag, four inches high; branches round and erect. Lower about three, linear-lanceolate, the upper ones gradually shorter; the lowermost as tall as the stem. Flowers alternate, white, ringent; their tube scarcely longer than the spatha." —Thunb.

13. G. gratilis. Jacq. C. R. t. 246. Ker in Curt. Mag. t. 562.—Leaves linear, ribbed, deeply furrowed on each side, with a very light midrib. Corolla somewhat bell-shaped; segments ovate, nearly equal —Native of the Cape, readily cultivated with us, blooming in March or April. Flowers watery, pale blue, more or less speckled with black and white on the two lower lateral segments; without scent. Bulb very small. Stem variously bent, slender, two or three feet high.

14. G. recurvus. Linn. Mant. 28. Ker in Curt. Mag. t. 578. (G. carinatus; Willd. Sp. Pl. v. 1. 211. Ker in Ann. of Bot. v. 1. 231. G. panducatus; Jacq. C. R. t. 247. G. ringens; Andr. Repof. t. 27 and 227. Redout. Lith.-Lilles, t. 123. G. alatus; Schneck. C. t. 12.)—Leaves linear, flat; rib prominent on each side. Radical sheath speckled. Segments of the corolla nearly equal, ovate, recurved. —Native of the Cape, cultivated and badly figured by Miller, and now frequent in gardens, where it is valued for the fine violet fragrance of its blue and yellow blossoms, more than even for their beauty or size, which equals that of most species. The leaves have a strong rib, prominent on each side, and the first sheath from the root is curiously speckled with brown, like the flasks of *Arum Dracunculus*. Thunberg confounded this and *gratilis* with *frizio*.

15. G. brevitus. Jacq. C. R. t. 249. Dryand in Curt. Mag. t. 592; and t. 727. G. carneus; Andr. Repof. t. 240.—"Leaf of the barren bulb solitary, linear, slightly downy; of the flowering one feehernay. Corolla somewhat ringent." —Native of the Cape, readily cultivated and encouraged with us. The flowers are, among the smaller sized, all bearing one way; variously tinged with pale purple or rose-colour, with some yellow; their three lower segments most speckled, and nearly of equal size, the uppermost one rather large, vaulted, recurved at the summit. The leaves are minutely downy, upright, linear or slightly lanceolate; very short, or rather mere scales, on the flowering stem; solitary and larger on the bulb, which produces no flowers.

16. G. biflora. Jacq. C. R. t. 250. Dryand in Curt. Mag. t. 574. (G. roseeus; Andr. Repof. t. 11.)—"Leaves linear sword-shaped, downy. Corolla nearly regular." —Native of the Cape; introduced into our green-houses in 1795, when it first flowered in the collection of Mr. Orde at Fulham. The broadish, downy, red-edged leaves are remarkable. The flowers are large and fragrant, rose-coloured; their segments elliptical, pointed, nearly equal. Jacquin's figure is indeed a poor one, but we can scarcely suppose, with Mr. Andrews, that it is drawn from a dried specimen, as the author says it flowered in his green-house, nor does he, like Pallas, often practise this without acknowledgment.

17. G. fimbriatus. Thunb. Diff. 9 t. 1. Linn. Suppl. 95.—Leaves linear, involute. Corolla ringent; segments elliptical-lanceolate, nearly equal, shorter than the tube. Stem zig-zag.—Gathered at the Cape by Thumberg, from whom we have a wild specimen. The stem is a spath high, irregularly curved, and zig-zag. Leaves feathery, short, linear, acute, smooth, involute. Spadix large, feeling, sharply pointed. Flowers very pale pink-coloured, with red ribs; tube capillary, an inch and half long; segments of the limb narrow, nearly equal in size, but ringent.

18. G. carneus. Jacq. C. R. t. 255. Ker in Curt. Mag. t. 591. (G. cistidatus; Andr. Repof. t. 147. Redout. Lith. t. 36.)—Leaves sword-shaped, many-ribbed. Segments of the corolla shorter than the tube: the uppermost broadest, with an involute recurved point; the three lower narrowest, well-ribbed. —Native of the Cape. A tall and handsome plant, with several many-ribbed leaves. Flowers inodorous, two-ranked, large, fusc-coloured with a rosy hue; their three lower segments oblong, bluish, each marked with a red rhomboid central spot; the three upper broadest, especially the top one, with long recurved points, whole edges are involute. The tube is slender, longer than the limb, twice as long as the spatha. This freely flowering species is a desirable ornament for the green-house in the spring.

19. G. cistidatus. Jacq. C. R. t. 257. Ker in Curt. Mag. t. 582. Redout. Lith. t. 176. Andr. Repof. t. 219. (G. undulatus; Linn. Mant. 27.)—Leaves sword-shaped, many-ribbed. Segments of the corolla half the length of the tube, nearly equal, pointed, undulated, reflexed. —Native of the Cape; now become pretty frequent in gardens, for the sake of its elegance of form and colour, and its fragrance in an evening. The very long narrow segments of the corolla, each of which has a recurved, channelled, undulated point, and the much greater length of the tube, are striking characters. The colour is pale greenish yellow, or buff, with a remarkable lanceolate spot, blazed with purple and red, on each of the three lower segments. Anthers deep blue. The Linnaean name ought to have been retained for this species, but to change the present appellation would now cause more trouble than advantage.

20. G. blanctus. Curt. Mag. ed. 2. v. 1. 98. Ker in Curt. Mag. t. 625. 643. 648. Andr. Repof. t. 99. (G. carneus; Del. Rev. Collet. 50. t. 4. Redout. Lith. t. 65. G. albida; Jacq. C. R. t. 255. G. composita; Andr. Repof. t. 188.)—Leaves many-ribbed. Tube of the corolla shorter than the spatha, equal to the limb, which is ringent, bell-shaped; its upper segment conic; three lower narrow, spotted. —Native of the Cape. Succedaned with us in the open ground, but the bulbs must be taken up every year. —This is an elegant species, with...
leaves of the sword-shaped many-ribbed kind like the two last. The flowers vary in colour, from white to a pale pink, their three lower segments bearing each generally a pair of crimson spots. They vary also in size, sometimes varying in this respect with the larger ones. They have no scent.

We cannot but complain of those authors who burden the public with figures of trifling varieties of this and other plants, for which a single plate ought to have been sufficient; nor does the centinences of a new name, though it may conceal the implication, by any means store for it.

Jacq. IC. Rar. t. 252. Ker in Curt. Mag. t. 602. Andr. Repol. t. 589. Mill. IC. t. 142. f. 2. — Leaves linear; midrib prominent on each side. Tube of the corolla longer than either spathe or limb; three lower segments ovate; three lower each marked with a triangular spotted scale. — Native of the Cape, from whence it was early introduced into the Dutch gardens. It is readily increased, but does not flower freely, otherwise its elegance could not fail to render it a general favourite. The narrow leaves, compared with those species nearest akin to this, and especially the three spade-like marks of the blossom, which are confluent, mark it sufficiently.

22. G. undulatus. Jacq. IC. Rar. t. 251. Ker in Curt. Mag. t. 538. 647. Schenck. IC. t. 19. Redout. Liliac. t. 121. (G. frutet. Andr. Repol. t. 111.) — Leaves sword-shaped, many-ribbed. Flowers erect, funnel-shaped; segments wavy, bluish; three lower ones much the smallest. — Native of the Cape; often cultivated in our gardens. The leaves are numerous, broad and upright. Flowers yellowish-white, or pale bluish-coloured, each segment always marked with a deep crimson central stripe which runs down into the tube. The latter is seldom longer than the spathe, often shorter. — The name of undulatus, which Linnaeus applied to our cupulatius, has been misapplied to this, with which however it agrees tolerably well, and we have already given our reason for retaining it. This species is the angustif of Thumberg, an appellation which seems corrupted from angustif, a totally different plant in every possible respect, nor are his quotations of Breynius, and of Linn. Mant. left erroneous. There is no end of correcting indifferent names, but undulatus ought, as Mr. Ker now allows, to have remained with the Linnean plant; if so, undulatus, in allusion to the somewhat familiar Armorvilia undulata, might have served for the species before us, though indeed it also suits the following.

23. G. floribundus. Jacq. IC. Rar. t. 254. Ker in Curt. Mag. t. 618. (G. grandiflorus; Andr. Repol. t. 118.) — Leaves sword-shaped, many-ribbed. Flowers erect, funnel-shaped; segments nearly equal, flatish, emarginate, the uppermost broadly rounded. — Native of the Cape; introduced into England by Lee and Kennedy in 1788. Bulb large. Leaves broad, with a thick edge, and often falcate. Flowers numerous, generally larger than in most other species, very pale pink, blue, or white, with a dark central stripe to each segment. The summits of the segments are emarginate, with a little point, and they are usually at undulatus.

24. G. Millari. Ker in Curt. Mag. t. 632. Alt. Hort. Kew. ed. 2 v. t. 101. (Antheion, &c; Mill. IC. t. 49.) — Leaves with many prominent ribs. Flowers inclining one way, bell-shaped; nearly regular; upper segment rather narrower than the next; tube flabby, slender. — Native of the Cape, but rare in gardens. Millar raised it from seed in 1757, and figured it as in Anthrop., It is of the same tribe as the two last, but differs in having a more inclined and more equal corolla, at full white then yellowish, with a darker purplish central stripe on the three lower than on the three upper segments. The tube, according to Mr. Ker's remark, though externally slender and exactly cylindrical, is peculiarly flabby, resembling a flower-flank. The outer perianth is inflated and convolute, often longer than the tube.

25. G. cardinalis. Curt. Mag. t. 155. Schenck. IC. t. 27. Redout. Liliac. t. 112. — Leaves many-ribbed. Stem branched. Flowers erect, in one row, funnel-shaped; segments elliptical; three lowermost small, each with a lanceolate white spot. — Native of the Cape, from whence it was brought to Holland, and from the latter country to England by Mr. Grafft; before 1789, unites we are greatly mistaken. It will bear an open border in a warm situation, but the bulbs must be taken up yearly to make it in which we have, the rich scarlet of its blossoms, and its three white spots, distinguish this fine species. Its green has a graceful call, and the stem is properly branched, two or three feet high.

The same alludes to the scarlet colour, like that worn by the cardinals at Rome, as used by Linnaeus in Lobelia and Linxia. The pious Scopoli thought the application proper, and changed it in the latter instance to fuchsia. See his Annus primus, 139.

26 G. byzantinus. Mill. Dict. ed. 8. n. 3. IC. t. 142. f. 1. Ker in Curt. Mag. t. 874. Dryand, in Alt. Hort. Kew. ed. 2. v. t. 102. Park. Parad. 191. f. 3. — Leaves many-ribbed. Spike two-ranked. Flowers horizontal; upper segment covered laterally by the next; three lowermost equal, each with a linear-lanceolate stripe. Supposed to be a native of Turkey, it being found for near two centuries a hardy inhabitant of our gardens, under the name of the Byzantine corn-flag, though generally confused, as G. commutis of Linnaeus, with the two following. We readily submit to Mr. Ker's corrections of this error.

The three segments of the lower lip are each marked with a central white or yellowish stripe, bordered with deep red, and more or less dilated in the middle. The flowers of the present species are larger than either of the other two, their three lower segments very nearly equal in size and shape; the uppermost is embossed and covered at its sides by the lapping over of the two lateral segments, so that the flower is closed, not pervious, at that part. It blossoms in June, rather before the commutis, but, according to Mr. Ker, never bears seeds in England, nor does it increase by root so rapidly as the other two.

27. G. communis. Linn. Sp. Pl. 52. Curt. Mag. t. 86. Riv. Monop. Irr. t. 116. (G. natobenris; Ger. ed. 104. Park. Parad. 191 f. 1.) — Leaves many-ribbed. Spike one-ranked. Flowers horizontal; upper segment covered laterally by the next; three lowermost each with a linear-lanceolate stripe; the central segment very large. — Native of fields in the south of Europe, especially in moist situations, where it is a troublesome weed. It is now kils commonly kept in our gardens than the last, from which it differs in the smaller size of its blossoms, which are approximately nearly into one row, only a little spreading alternately, and whose lowermost or central lobe is as broad as both the other two, and considerably longer. This is viable, even in dried specimens.
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specimens. We have this species from M. Favrod's herbarium, gathered wild in Switzerland, so that it appears to be Haller’s n. 1261, the smaller variety; his larger being probably the following species. There is much difficulty in determining the synonyms of old authors, their cuts not being correct in those parts on which our characters are founded; Parkinson’s G. italicus, for instance, Parad. 191. f. 2, has precisely the lower lip of this present species, but not the indorscence, whilst his f. 1 does not show the lip so well as the position of the flowers. As however he mentions but two white stripes in his description, so many only being visible, as the segments naturally and in our communis, we have little doubt of his synonym. The communis of the Linnean herbarium is our’s, and has winged seeds, so that we trust this name will remain fixed, as belonging to the most common and general species, whatever Linneus might comprehend under it as varieties.

28. G. figatum. Ker in Curt. Mag. t. 719. Dryandr. in Ait. Hort. Kew. ed. 2. v. 1. 102. (G. communis; Bulbiard. Herb. de la France, t. 8. Sm. Pl. Grec. Sibth. v. 1. 27. t. 37. 39. Lamarck Illufr. t. 32. Tourn. t. 190. G. italicus; Ger. em. 104.) Leaves many-ribbed. Spike one-ranked. Flowers horizontal; upper segment dwarfed; three lowermost equal, each with a linear-lanceolate bordered stripe.—Native of corn-fields in the south of Europe, common in Italy, Greece, and the neighbouring countries. Flowering in the spring; rarely, but not the least frequent in gardens. It is distinctly represented in the Hortus Eystettensis, by the name of Pictoria rotunda; Ord. Eff. 4. t. 10. f. 2, though the other Gladoli of that huge book are less precise. This is distinguishable from the last by the distance between the uppermost lobe of its blossoms and the two next, which are peculiarly narrow; while the seeds, according to Mr. Ker, are round, with a somewhat pulpy coat, not flattened and winged as in the whole of the genus beside, which is a most material specific distinction, and even forms an exception to one of the generic characters. Mr. Ker suspects the existence of other European species, still confounded as varieties of these, and which may perhaps account for anomalies and incongruities in the figures of authors. Whether t. 38. of Flora Graeca may be one of these, we must submit to future enquiry. Though small, it is said to be a native of fertile ground; the three upper segments seem more approximated, and the three lower ones united by a longer base, than in t. 37. our G. figatum; but this we learn merely from the figure, and was not the least acquainted with the characters subtilely found out in this tribe, so as to give peculiar authority to what he has expressed in his drawing. The acquisition of living specimens at some future time can alone settle the question.—It is proper to mention that G. figatum of the Linnean herbarium, alluded to by Mr. Ker, is a Siberian specimen, with very broad lateral segments to the corolla, and as far as we can judge seems rather to be communis, if not, as is possible, a species hitherto undefined. It is probably different from the African plant of Van Royen, intended in Sp. Pl. ed. 1, nor has it the authentic marks of originality. What might chance to be compared with it in the Bankian herbarium, when none of the parties present had any precise ideas about these plants, we cannot answer for, but our specimen was then voted to be communis.

29. G. imbricatus. LINN. Sp. Pl. 52. Lamarck. Dict. v. 2. 725. Leaves many-ribbed, spike of numerous, crowded, upon flowers; upper segment rather dilated; three lowermost nearly equal. Gathered by Gerber near Luban in Livonia. His own specimen in the Linnean herbarium is the only one we have seen, nor do recent writers appear to know anything of this species, which appears to us very distinct, akin to the three lal in leaves and habit; but differing widely in its curved ascending spike, and crowded erect flowers, which are smaller than those of G. communis, of a purple or crimson colour, persiant at the base, in consequence of a considerable distance between the claws of the upper and lateral segments, while their upper parts seem to fold over each other; but of these characters we cannot, of course, speak absolutely, from the dried flowers; the three lowermost segments seem equal and rather narrow. No white stripe is discernible in their present condition. The leaves rise above the spike of flowers, and have each an oblique point, but this may not be constant.

Whatever species of Gladoli (exclusive of such as are now referable to the genera Sparaxis, Anomolobus, Tritonia, Watsonia, Mesolophus, or Balhana of Mr. Ker), may be found here and there in authors, we decline describing without seeing living specimens. The discrepancy between several of the figures, above quoted for the same species, proves how variable many of them are, especially from accidental circumstances in cultivation. The Botanical Magazine is now become a faithful and valuable repository of this family, so that however botanists may differ about definitions, the memory of the plants can never be entirely lost.

GLADIOLES, in Gardening, comprises plants of the tuberous-rooted, flowering, perennial kind; of which the species mostly cultivated are the sword-lily, or corn-flag (G. communis); the iridescent flowered gladiole (G. imbricatus); the square-flaked gladiole (G. tridix); the narrow-leaved gladiole (G. angustifolium); and the superb scarlet gladiole (G. cardinals).

There are several varieties of the first species, as the Italian and French corn flags, with the bluifli, the white, and the small purple colour'd.

Method of Culture.—In the first fort and varieties the culture may be readily effected by planting the off-sets from the old roots in the beginning of the autumn in the places where they are to grow. And the other off-sets may be raised in the same way as well as by seeds. These should be planted in a warm border, and be protected in the winter by glafs or some other means, when there is a necessity for it, as during very severe weather, &c.

When increased by seed it should be sown towards the end of August, in pots filled with light earth, placing them in a shady situation at first, but afterwards where they may be exposed to the sun, being protected during the winter in a hot-bed frame, free air being admitted when the weather is mild. In the spring the pots should be removed to a shady situation, with only the morning sun. When the stems decay, the roots should be taken up and kept in sand in a dry place till the time of planting. In the second year’s planting they should be put in separate small pots, filled with mould formed from the turf or earth.

With respect to the old roots they may be taken up every two or three years, to have the off-sets taken off from them, in order to their future increase.

All the off-sets afford a fine effect and variety in the flower borders and other parts among other plants of the flowery kinds, being properly arranged in mixture with them.

GLADIUS, Sword. "As Gladoli, or right of the sword," is used, in our ancient Latin authors; and in the Norman laws, for supreme jurisdiction.

Cassiodorus, in Britannia, writes "Comitatus Flitus pertinet ad gladium Certrie;" and Selden, Tit. of Honour, p. 960, "Curiam suam liberam de omnibus placitis, &c. exceptis ad gladium ejus pertinenticibus."

And it is probably hence, that at the creation of an
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earl, he is gladius facinus; to signify, that he had a jurif-
diction over the county.

GLADUS jficus, in Italology, a name used by many for the
sword-fish, called also the aperian, which see.

GLADEKA, in Geography, a fort of Kiffia, in the go-

government of Caucaus, on the Malva; 36 miles W. of
Kiffa.

GLADWIN. See Iris.

GLADWIN, John, in Biography, the late organist of South
Audikey chapel, was the first performer on the organ of
Vauxhall, after the building of the orchestra in the middle
of the garden, and the establishment of a regular band. He
was a playing player in his day, and a worthy man, who
lived to a great age, and died in 1700.

GLAIR of Eggs, is the same as the white of eggs, and is
used as a varnish for preferring paintings. For this purpose
it is best to an uncertain confidence, and commonly mixed
with a little brandy or spirit of wine, to make it work more
freely, and with a lump of sugar to give it body and prevent
its cracking; and then spread over the picture or painting
with a brush.

GLAIZE, At; in Geography, a S.S.W. branch of the
Miami of the lake in America, which interlocks with St.
Mary's river. By the treaty of Greenville, the Indians
have ceded to the United States a tract of land, six miles
square, at the head of its navigable waters, and six miles
square at its confluence with the Miami, where port Defiance
now stands. See CAMILLUS.

GLAMMISS, in Geography, a small town in the county
of Forfar, Scotland, contains 385 houses, and 151 inhabi-
tants. Here are two small manufactories of yarn, and coarse
linen cloth. The earls of Strathmore formerly poifoned, and
occupied a noble caille in this parish. The remains of this
baronial fortress are still very considerable, and occupy a
commanding site on the banks of the river Dean. In this
parish are several ancient obelisks, or stone crosses; also many
caves. These are traditionally laid to commemorate the
murdered king Malcolm II. Glamis is divided into two
parts respectively, called the New, and the Old Town.

GLAMORGANSHIRE, the south maritime county of South
Wales, is supposed to have derived its name from
having afforded a temporary, though lucrative, retreat to an
ancient prince, at a very early period of British history.
The story is briefly recapitulated by Spenser, in his Chronicl
of British kings. (Fairy Queen, b. ii. c. 10.) Glamorgan
was in succeeding ages an independent sovereign prin-
cipality, distinct, as those who profess to be acquainted with
the ancient history of Wales allert, from the rule and go-

government of South Wales. The principality, or sovereign
lordship of Glamorgan, as their persons say, contained the
present counties of Glamorgan and Monmouth, the southern
and eastern parts of Brecknockshire, and that part of Here-
fordshire lying to the west of the river Wye.

The lordship of Glamorgan was subdivided, at an early
period, into a great many petty lordships, in every one of
which their lords exercised "ius regalum," referring, how-
ever, to the subject a right of appeal to the court of the
chief lord, or, as he was termed, the lord paramount.
There are at least 50 ancient buildings still remaining in the
district, universally understood to be the halls in which the
courts of legislation and of justice were held for the respec-
tive petty lordships. They are now commonly called
"Church-houses," and belong to the parishes in which they
stand. They are at present used as school-houses, and occa-
sionally for dancing an amusement still common in Glamor-
gan, though now beginning to decline. The ground-

floor apartments under these halls are used as alms-houses
for the poor of the parish. From ancient surveys and other
accounts of the lordships it appears that before the reformation
a market was held in each of these halls every Sunday morn-
ing, till the tolling of the first bell, which is said to have
been intended as a notice for the Llanfèds of the market to
coast. The second bell was a signal of preparation for
church, and the third for the commencement of divine ser-
vice, during which no door, but the church door, was allow-
ed to be open.

This county, extending about forty-eight miles from east
to west, and 27 from north to south, is bounded on the N.
by Brecknockshire; on the E. by Monmouthshire, from
which it is separated by the river Kenfig, on the S. by the
Bristol channel, and on the W. by Caermarthenshire. The
greatest part of the sea-coast forms a semi-circular curve;
the western extremity being formed into a narrow beak be-
tween the open channel on the one hand, and an arm running
round to the Caermarthenshire coast on the other. See
GOWER.) An ample account of the manner in which the
lordship of Glamorgan was obtained by its conquerors, is to
be found in Powell's History of Wales, written in the time of
Elizabeth, or in Evans's edition of Wyne's History of
Wales. The following abstract is taken from Malkin's
work. Jeflin ap Gargant, a petty prince of odious charac-
ter, waged war, in the year 1489, against Rees ap Tudor, and
was assisted by Encon ap Collwyn. Unable to make any
inroads upon his enemy's dominions, Jeflin considered
Encon to go to England, and to procure force more power-
ful ally. His propositions were eagerly received by Robert
Fitzhawen, and twelve other Norman adventurers, who came
to Glamorgan on an expedition, professedly for the purpose
of retrieving the affairs of Jeflin. The allies, marching against
Rees ap Tudor, came up with his forces on the borders of
Brecknockshire. In a battle which ensued at a place called
Hirwin, Rees was entirely defeated: and in his flight was
taken prisoner, and put to death. On this occasion, Jeflin
betrayed his characterisf treachery, by violating his agree-
ment with Encon, to whom he had promised his daughter in
marriage, as a recompence for his services. Encon, justly of-
fended, was determined on revenge: and therefore, when the
Normans, after having fulfilled their engagements, and hav-
ing obtained satisfaction for their services, quietly returned
home, Encon represented the injuries he had sustained by the
treachery of Jeflin, and also the hatred of the country
to its tyrant. He also stated how easy it was to obtain po-
fession of this fertile country, with the aid of the different
princes at variance with Jeflin. R. Fitzhawen, and his fol-
diers of fortune, availing themselves of the favourable mo-
ment, turned their arms against their employer, who was
unprepared for so formidable a reverse, and overran the
country; whilst Jeflin saved himself by flight, and died soon after,
unhonoured and unremembered. Fitzhawen, upon a division
of the conquered territory, took for his own share the castles of
Cardiff and Kenfig, with the market town of Cowbridge,
and the demesne of Llantwit; appropriating to himself the
lands belonging to them, together with the sovereignty of
the whole country. The other parts were distributed in va-
rious proportions among his followers. Encon ap Collwyn,
in particular, poifoned Caerphilly, with Jeflin's daughter in
marriage, the prize which occasioned the contest. (See
WALES.) With respect to the picturesque character of this
county, it is distinguished by unbounded variety. It has
its mountains, valleys and rivers; and it is said to resemble
North Wales in general aspect more than any of the fix coun-
ty. Its mountains are not so high as those of Breck-
nockshire, but they present, in a considerable degree, the
appearances.

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The antiquity of the cottages is a strongly marked feature in the appearance of this county. Many of them are probably as ancient as the castles, to which they were attached. Their architecture is particularly pleasing to the eye. The pointed doorways, and pointed windows, sufficiently evince their date; and though Welsh towns are universally adorned by strangers, for the inutility and inconvenience of their houses, the direct reverse is the fact with respect to the habitations of the peasantry. There is one circumstance, besides their general structure, that of many of which is the ancient Gothic, which adds to the respectable appearance of the cottages, and that is, the universal practice of lime-whitening them. This has been the custom of the county from very remote ages, and is extended even to the houses and stables, to the walls of yards and gardens. It is noticed and praised in the most ancient Welsh poems, and certainly evinces a very early sensibility to the arts and deprivations of life. The price of provisions in this county has of late very much increased, and is comparatively very high, on account of the increased demands of the manufacturing districts, which are numerous. The price of labour is equally enhanced from the same cause. The increase of population, owing to the influx of commerce, and the magnitude of its establishments at Swansea, Merthyr-Tydvil, Neath, Aberavon, Mumbles and Bridgend, near Cardiff, where are the largest tin works in the kingdom, &c. afford another reason why the cheap comforts and elegancies of life are no longer to be sought for here.

The dreariness of Glamorganshire is not so strongly marked as in some other counties, except that the women universally adopt the man's hat; but they wear it with a very good grace, and are remarkably neat in their attire, as well as in their persons, and graceful in their carriage; which may probably be attributed to the habit of dancing, which is their favourite amusement. Their modes of greeting are mutually affectionate, sometimes bordering on the ludicrous, particularly among the women, who are constantly seen flattering each other at market, and on the most ordinary occasions of business, as well as on occasions of distress. At a wedding it is the custom of all who are invited, both men and women, to ride full speed to the church porch, and the person who arrives there first has some privilege or distinction at the marriage feast. In case of death, the bed on which the corpse lies is always draped with flowers, and the same custom is observed after it is laid in the coffin. It is an invariable practice, both by day and night, to watch a corpse; and the hospitality of the country is nowhere remarkable on meanness than on joyful occasions; for the invitations to a funeral are very general and extensive; and the refreshments are not light, and taken standing, but substantial and prolonged. The grave of the deceased is constantly overgrown with plucked flowers for a week or two after the funeral; the planting of graves with flowers is considered to the villages, and the poorer people. It is an invariable custom to dress the graves on Whit Sunday; and other festivals, when flowers can be procured.

The Roman stations, forts, and camps, in this county, are generally understood to be at Cardiff, Caerphilly, and Caernarvon, which lies between Wenlock, a large handsome house built in the castellated form, and the Cardiff road. The great Roman road was over Newton Down, leaving the present road on the right, and passing through Kennig to Margam, and as straight as the nature of the country will admit, through Abecavon parish to Neath. Glamorganshire contains one episcopal town, viz. Llandaff, and several others, as Cardiff, the capital of the county, Caerphilly, Llantrisant, Cowbridge, Bridgend, Neath, Merthyr-Tydvil, and
GLAND, in Anatomy, is a name applied to those organs of the body, which separate from the blood conveyed to them by their blood-vessels various substances, generally of a fluid nature, and discharge them through one or more tubes, called excretory ducts. The term however has been, and is employed more extensively, having been applied to various organs, which, although analogous in their structure, on superficial observation, to those already designated, do not refer them at all in their functions. Thus, the small bodies belonging to the lymphatic system have been called lymphatic or conglobate glands; although the knowledge hitherto acquired by physiologists concerning the action of these bodies, and their anatomical relations and connections do not warrant us in ascribing to them any function similar to those exercised by the glands properly so called: the account of these will be found under the articles ABSORPTION and ABDUCTION. The pineal, thyroid and thymus glands, the renal capsules and the spleen, have all been included in the glandular system of the body, but will not be considered in this article, as we know nothing at all of their offices, and have no reason to suppose that they secrete any fluid. Our definition will include the salivary, lacrimal, and Meibomian glands, the tonsils, the serous glands of the ear, and the sebaceous glands of the face, the mammary glands in the chest; the liver, pancreas, and kidneys in the abdomen; the prostate, testicle, Cowper’s glands, and glandular odoriferous about the penis; and the extensive fleshy mucous glands about the head and trunk. These parts, although differing widely from each other in many respects, agree in a sufficient number of points to allow of their being arranged in one organic system, which has been named the glandular: the other organs thus enumerated, belonging to this only in name, are excluded from the arrangement by their texture and properties, their mode of vitality and functions. The extremities contain no parts belonging to the glandular system; the fluids formed in the different organs of this apparatus belong almost entirely to the organic functions, while the limbs are particularly designed to execute the offices of the animal life.

As the physiology of these organs cannot be conveniently separated from the history of their structure, we shall consider the vital properties as well as the organization of the glandular system; and we should make a very unnatural and arbitrary division of the matter, if we did not give at the same time a view of secretion in general. We shall present the reader, in the first place, with an enumeration and arrangement of the secreted matters; we shall proceed, fecondly, to give a general view of the organization of the glandular system; and shall exhibit, in the third and last place, the opinions of physiologists concerning the mode of action of the glands and the subject of secretion in general. The reader will observe that the present article is of a general nature; the structure of the particular organs will be described on other occasions, and detailed accounts of the nature and properties of the various fluids will be found under their respective titles, or in other articles of the work.

The blood, apparently an homogeneous fluid, is composed of various matters, which chemical examination can detect and separate. It contains gelatine, albumen, fibrine, acids, alkalis, earths, saline and colouring matters, which are employed for the renovation of the solids and fluids of the body. It presents these to the various organs, which, by converting them into their own substance, derive the means of supplying the waste occasioned by the natural actions of the parts, or form out of them various products, distinguished by new characters, and extraneous to their own composition.
tion. The former of these processes is nutrition or assimilation; the latter secretion: they resemble each other in their commencement, in which the organ, by some powers of a nature entirely unknown to us, but peculiar to living bodies, and forming part of that complicated notion, which we express by the term vitality, affects from the blood such principles as suit its nature or functions; but they differ in the employment of what is thus selected, which is retained in the body, and assimilated to the already existing organisation in the former case, and applied to some other purpose in the latter. The subject of nutrition does not come under our notice at present.

The products of secretion result from an essential change in the compound conveyed to the organ, from a new combination of the principles contained in the blood, which is transformed by the specific action of the various organs into different fluids, retained in or expelled from the body, according to the qualities of each. Hence, there are organs which, after forming certain fluids, collect and retain them; while others secrete and expel their secretions from the body. The object of the secretions is, to collect those which are defined as full important uses in the body; while that of the excretions is, on the contrary, to expel matters which would be injurious to the frame. The two functions then of secretion and excretion resemble each other in multiplicity; there is in both a separation and collection of fluids. The difference consists in this, that in the former case the separated fluid remains in the body, while it is expelled in the second. Thus secretion always precedes excretion; and, in order to understand the latter, it is necessary to know how the former takes place.

The word secretion, derived from secernere, I separate, signifies simply the act of separating; and its physiological import is conveyed in that notion. It denotes, in physiology, that function of living bodies, in which various fluids, differing from the blood and from each other, are prepared from the common mafs of the blood, the same fluid being constantly formed in the same organ. No part of physiology is more obscure, and more difficult in its investigation, than this very function. Malpighi, who had bestowed great labour on the structure of the glands, and was considered to have unveiled, in a great measure, the mysteries of their organization, confesses his ignorance on this subject; and, as the avowal, from such a quarter, is interrelling, we subjoin the passage, observing that the remarks here made, concerning the kidneys, apply equally to all other secretions. He says of the urinary secretion, "quam arti id contingat obscurifimum: licet enim gland darum minimis totum loco subfequi rationi fit couumum, quoniam tamen minima illa, simplexque meatum in gladdis structura nos latet, idae quaedam tantum mediari possit nos, ut huic quaestu probabilitatis satisfaciencium. Necesse est hanc machinam interna configurationem separatifam opus peragere; an vero his, que ad humanos usus paflim uspum, quibus fere conftimlia effignia, confofed, dubium; licet enim occurrit analagae fponzia, incerti fulituram ciborumque structuram, in tam ex his conftimlia undequeque fit renum fabrica, difficillimi- mum eft aflignare, et cum naturae operandi industria fecundissima fit, efdem ignoto nobis reperientur machine, et quas nec mente quidem aliefi licet. Iliad miror tam copia, diversaque corpora separari per has glandulas in natura flatu, ex eim subflantiqna aqua cum salinis, fulphureis et conftimlia particulas, et ex morbo etiam aliefiinam robiquae, et totius quandoque corporis inquinamenta separantur de traditis linguinis particularis," &c. De Vicerum Structura; De Renibus, cap. 6. The whole business is carried on in the minute, and, as we may call them, elementary parts of the vicerum and glands, the structure of which eludes the research of our senses, and can still be developed by reasoning or reflection. Observation cannot follow the work throughout; nor does it admit of elucidation by experiment, like some other subjects which have been explained by artificial imitation of the proceedings of nature.

Unwilling to confess their ignorance and leave their systems imperfect, physiologists have attempted to raise, on hypotheses, that structure, for which anatomy afforded no foundation. Their notions, resting merely on probabilities and loose analogies, have flourished and fallen in succession; and we shall find that the lift of truths and ascertained facts is much shorter than that of opinions and errors.

The composition of the secreted fluids presents various differences in the nature and proportions of their constituent parts. They posse, in common, all the general characters which belong to animal subfiances: but each has certain particular distinctive qualities, depending on the various simple or compound principles, the union of which determines its specific nature. Thus, setting aside the remembrance of all our fluids, considered as animal productions, fat does not resemble bile; the latter is very different from milk; which, again, has no resemblance to the salivary, gastric, pancreatic, seminal fluids, &c. which must be referred to so many different classes.

The arrangement of the animal fluids is more difficult than we should have expected at first sight. The false and imperfect notions, which were long entertained of their chemical composition, lead to classifications founded on the uses to which they seemed to be defined. Those employed in the nourishment and growth of the body were called recrementitious, such as chyle, blood, serum, lymph, &c. The excrementitious included those which are expelled from the body; as the urine, perspiration, &c. A third class was made up of such as partake of the characters of both these; of which a part is rejected as noxious, while the rest is retained, in order to answer some particular purpose. Under the head of excremento-recrementitious humours, were arranged the saliva, bile, pancreatic juice, mucus of the intelleines, &c. The objections to such an arrangement are too obvious to need enumeration. This division, as well as that before alluded to, of excretions and secretions, cannot be adopted with any benefit, while the nature and objects of many secretions are not understood, that we cannot determine whether they are expelled as noxious, or serve very useful purposes in the economy. The bile, for example, has been commonly deemed an excrementitious fluid, but by a completely arbitrary assumption; what proof have we that perspiration separates any thing noxious from the blood? For what reason is the secretion of the pancreas placed in one rather than in the other of these divisions?

Pitcairne, who was followed by Michelotti, divided the animal secretions in a manner which has, at least, the merit of simplicity, and leads to no false notions concerning their uses; he distinguished them merely as being thick or thin.

Haller distributed the fluids into four classes, according to the chemical notions of his time, and to the degree of complication in their elements. I. The aqueous fluids. These have a very large proportion of water in their composition; hence they are distinguished by their fluidity, and have no rupines. Fire dilates them almost entirely, excepting a very small proportion of earthy refuse; neither alcohol nor acids coagulate them. Besides a little earth, they
by a chemist of the present day, would be found open to objection at all points. The deficiencies of the classification are too obvious to render it necessary that we should particularize them.

Blumenbach hasclassed the products of secretion on a somewhat different principle. "The secreted fluids," says he, "display on one hand so much variety, while on the other they seem to be joined by so many points of affinity, that their arrangement in classes must be in great measure arbitrary. They may, however, be disposed in the following order, according to the lighter or more effe\ntual changes and modifications which their elements, contained in the mufs of the body, undergo in the secretory organs. Milk may be placed in the first rank, as consisting apparently of a very simple modification of chyle, and formed from the blood by a very easy process after the influx of the chyle. The watery secretions come next, so called from their fluidity and transparency, although they differ materially from water in the nature of their constituent elements, particularly in containing a portion of albuminous coagulable matter—including the fluids of the eye; the tears, the matter of perpiration, the exhalations in the external surface of the skin, and in the external and abdominal cavities, to which the liquid pericardial and the fluid of the ventricles seem to be analogous. The urine, ordinarily referred to the aqueous fluids, is distinguished by very remarkable peculiarities. The salivary fluids, concerned in the functions of mastication, digestion, and exhalation, seem to be rather more changed. Then follow the mucous secretions, spread over the surface of most of the visera belonging to the natural and organic functions, as well as the cavities of the nose, larynx, and respiratory organs. The mucus in the interior of the eye, as well as that under the epidermis, do not appear to differ essentially from the preceding. Under the title of adipous fluids may be classed, besides the common fat, the medulla of the bones, and the albuminous matter of the skin (including also the cornum of the ears). The fatty matter formed under the prepuce about the corona glandis of the male, and the similar production in the female pudenda, may be referred to the same class; as well as the secretion of the Meibomian palpebral glands. The fluid contained in the early months of conception between the chorion and amnios, of which the vesicle umbilical, and that which surrounds the vesicles of the umbilical cord, is as yet little understood. The contents of the Graafian vesicles, and the prostatic fluid, seem to be truly serous or albuminous. The male femen is quite a peculiar product, not to be compared to, or classed with, any other; and the fame remark will hold good also of the bile." Inutito, Physiolog. sect. 32.

The division of this able physiologist would be natural and instructive, if the animal fluids deviated from the nature of chyle by gradations which could be easily perceived and named. But we really cannot establish among them any order corresponding to their natural composition; and the differences observable between chyle and fat, between the aqueous fluids and bile, constitute intervals, which we cannot appreciate or measure. Indeed there are so many differences and so few relations between one fluid and another, that we can scarcely compare them at all.

The vast progress which chemistry has made of late years, and the valuable discoveries with which the analysis
of animal substances, as well as other parts of the science, has been enriched; might have led us to expect that the classification of the fluids would have been reformed according to their constituent principles, and brought into a condition corresponding to the rest of the science. Fourcroy has indeed given such a distribution of the subject in his Elements of Chemistry; but he does not seem to value the arrangement very highly, as he has not continued it in his later work, the "Système des Connaissances Chimiques." In proportion as the various animal products are analyzed with more accuracy, they are found to possess specific characters which distinguish them from each other; and therefore render it impossible to refer them without inimicity to any general heads: accordingly in the most recent and able chemical works, they are enumerated and considered separately. In this point of view, therefore, the exactness and perfection of modern analysis renders our attempts at a general arrangement of the animal fluids unavailing; and it has only served hitherto to show the defects of such methods.

Dumas, in his "Principes de Physiologie," adopts a different plan, which he calls a natural physiological one, and to which he attributes the advantage of connecting closely the knowledge of the fluids with that of their uses. "This method," he observes, "is the most natural and useful of all, as it refers the fluids to the various organic systems in which their secretion takes place, to make a class of humours for each system, to consider each of them as inapplicable from the system to which it belongs, and to conduct the study of both together. We shall therefore have as many different classes or species of fluids as there are organic systems in the body. This simple and natural method of considering the subject appears to me to be preferable to the more laboured arrangements founded on the essential nature and chemical composition of the fluids, because it is not exposed to that uncertainty, which the imperfection, the variations, and even the progress of our knowledge concerning the nature and properties of animal matters, must unavoidably occasion. It is, moreover, the most easy and instructive way to consider the secreted fluids in their relations to the solid organs, with whose functions they are concerned. The distribution of the animal fluids with regard to the seven organic systems of which the human body is composed, will be better understood by presenting it in a tabular view, where their relations, influences, and uses, will be immediately perceivable.

Fluids of the nervous or sensitive system.

Fluid of the ventricles of the brain,
Aqueous, vitreous, and crystalline humours of the eye,
Tears,
Methanion secretion,
Mucus of the nose,
Cerumen,
Fluid of the labyrinth of the ear,
Saliva.

Of the muscular or moving system.

Fibrine,
Scrivity,
Fat.

Mucus of the trachea and air-veins,

Of the vascular or caudal system.

Fluid of the pericardium,

Mucus of the mouth, pharynx, and alophegus.

Rumach,
Intelines,
Kidney and bladder.

Gastric fluid,
Pancreatic fluid,
Intestinal fluid.

Expiration of the abdominal cavity,

Bile,
Liquor of the rectal capillaries,
Urine.

Residue of all the fluids, and of nutrition,
Lymph,
Fat of the cellular tissue,
Mucous fluid.

Prostatic liquor,
Mucus of the urethra,

Vagina.

Seminal fluid,
Expiration of the tunica vaginalis,
Contents of the ovarian vessels,
Liquor amni,
Mecosum.

Galline,
Medulla,
Synovia.

Of the fluids just mentioned, some are secreted in certain organs belonging to their respective systems; e.g., those of the compound glands, of the glandular viscera, &c.; others are formed over whole organic systems, without any particular apparatus, as the exhalation in the cellular membrane, that of the circumference of organs, &c.; while others are not the produce of secretion, but move freely through all parts of the system in which they are concerned, as the blood and contents of the absorbing system. With the latter we have nothing to do at present; neither does the organization, from which the fluids of the middle class are produced, come under our consideration in this article, but it will be described in INTESTINES, MEMBRANE, AND CELLULAR SUBSTANCE.

The physiological theory of the secretions must be founded on a perfect knowledge of the nature of the animal fluids, and of the structure of the secretory organs. The solution of the interesting problems arising out of this subject, can be expected only from the union of anatomy, enlightened by just views of physical science, with chemistry, supported and directed by physiological observation. The secretory organs are of various kinds, and preserve a constant relation to the kind of secretion, and the manner in which it is effected. Those fluids, which seem to be derived from the blood, with the least change, are not produced by a complicated organic apparatus. The exhalation, which moisture the surfaces of the circumference of organs, the aqueous vapour of the lungs, and the entaneous perspiration are formed by organic systems, composed chiefly of vascular ramifications, without possessing any thing that is at all analogous to glandular structure. The arrangement of the fibrous tissue of muscles, and of the bone fabric, admit of the same remark; if we suppose that these organs habitually secrete fibrine or bony matter. But these are cases, which come under the description of nutrition, and in this line all parts of the body may be called secretory organs,
Gland.

The mucus fluids, which appear to differ more considerably from the materials in the blood, are generally separated by particular glands, which are called cysts or follicles, contained in the subflance of the membranes or viscera. But it seems probable, that these also may be separated from the blood by arrangements of a simple membrinous texture, without any express glandular structure, as in the case of several visceral membranes. It remains therefore for us at present to explain, in a general way, the anatomical structure of the various glands, by which the other animal fluids are secreted.

The glandular differs from most other systems, in the animal economy, in this circumstance, that its peculiar tissie is not exactly identical in all the organs belonging to it. The fibres of any voluntary muscle would serve equally well to compose any other of the same kind. Tendinous fibres, cartilaginous and bony structures, are the same everywhere. The subflance of the liver, on the contrary, is widely different from that of the kidney; which again is very distinct in its character from that of the salivary glands. The glandular system, therefore, is marked in its various parts with very few general attributes, which also suffer many exceptions.

Situation, form, division, &c. of the glandular system.—

Glands have two different situations in the body. Some are superficial, as the breasts and salivary glands; others deeply seated, as the liver, kidneys, pancreas, and most of the mucous glands, and consequently, not exposed to the action of the external bodies. Many of them occupy situations where there is much motion, as the salivary glands near the jaw, the mucous in close contact with a plane of muscular fibres, the liver in the vicinity of the diaphragm, &c. These facts have led to the supposition that the neighbouring motion, extraneous to their functions, determined the excretion of the secreted fluids. But, in the first place, the palatine glands, the pancreas, the tricusps, and even the kidneys, are so situated, as to be out of the way of such external afflication. And we observe, further, that mucus is secreted as abundantly by the pituitary membrane, as in any other part, although there is no muscular plan here; that the lining of the bladder produces an equally copious supply, when the vices is paralytic; and that various causes augment the secretions, without any connection with the circumstance first alluded to, as salagogue medicines, or the fight of food in the cafe of salivary glands. We cannot doubt, therefore, as Boreus has observed, that this mechanical cause has nothing to do with the matter, and that the essential cause of all excretion consists in a peculiar vital action.

Some glands are single, as the liver and pancreas; others are arranged in pairs, as the kidneys, salivary, and lacrymal glands. The latter are similar on both sides of the body; but the resemblance cannot be compared, in respect to its exactness, to that of the double organs in the animal life. One kidney is lower than the other; their arteries, veins, and nerves, are not analogous in length or tone; often various branches exist in one, and not in the other; the same observations will apply to the salivary glands.

Generally the forms are not determined in a very certain manner in this system: they are subject to innumerable modifications in volume, direction, and the different proportions; and differ remarkably, in these respects, from the precise and rigorous laws which govern the conformation of the organs of animal life. Take some one organ, by way of example, from both lives. A small brain will be found to possess a corpus callosum, thalami optic, and corpora striata of corresponding size; while, on the contrary, a large liver often has a small lobus Spigelii, and vice versa.

A kidney will often be larger in its upper portion only, or in the lower. These variations in the animal life affect the whole organ; while they frequently are observed in some part only in the organs of Bichat, who makes this remark, endeavors to explain the fact, by his opinion concerning the necessity of a harmony of action in the animal life. If one side of the brain were developed more than the other, or one eye, one ear, or one side of the face exceeded the corresponding organs, the operations of the mind, the sense of sight, hearing or smelling, would be inevitably disturbed: while the secretion of bile or urine would go on equally well, although some particular part of the secreting organs were proportionally larger or smaller than the others. The glands, which are surrounded by membranes, as the liver, kidneys, and even the pancreas, are left subject to these variations of figure, than those which are contained in the cellular subflance, without any membranous covering, as the salivary, lacrymal, mucous glands, &c. Thoie of the latter description in the mouth, and along the trachea, are never alike in two subjects. The parotid sometimes is prolonged over the malletur, and at others leaves that muscle uncovered; and when either of these glands is fo deformed, as to be incapable of continuing its functions, that on the opposite side of the body either increases in bulk, as we may sometimes observe in the kidneys; or its secretion is augmented.

The surface of such glands as are not covered by membranes is uneven and tuberculated; it may be in contact with muscles, vessels, nerves, &c. even with bones, as in the salivary and lacrymal glands. In general, they are surrounded by a cell:ular tissie, than organ which have considerable motion. That which is in immediate contact with them is dense, like the exterior covering of arteries and veins, but it is not firm. It does not usually contain fat; and by isolating the gland to a certain degree, it is analogous to the peritoneal covering of the liver, or to the proper membrane of the kidney or spleen. Anatomists have very commonly divided the glandular system into the conglobate and conglomerate glands. The former name denotes the gland-like bodies belonging to the lymphatic system, and was designed to shew that each formed only one mass. The latter term is most properly applied to the salivary and lacrymal glands and pancreas, which are made up of numerous smaller particles united together. It cannot well be given to the liver and kidneys, which possees nothing of a conglomerate structure; and these, accordingly, have been generally called glandular viscer.

Organization of the Glandular System.

1. Peculiar tissie of this system.—The glandular tissie differs from most others, in posseing no marks whatever of a fibrous disposition. Its component elements are not placed by the side of each other, according to longitudinal or oblique lines, as in the muscles, the fibrous stylen, the bones, nerves, &c.; but they are heaped together, by a kind of confud, and, as it were, calinal approximation, and adhere together but weakly. Thus, while organs, which possees distinct fibres, have considerable powers of resistance, particularly in the direction of their fibres, glands are torn easily by slight degrees of violence. The broken surface is uneven, full of projections and depressions, which distinguishes these organs from cartilage; the rupture of which is generally smooth. The prostate, tonsils, and mucous glands resist much more powerfully than the liver and kidneys, in which the phenomenon just mentioned is the most easily observable. The pancreas and salivary glands are elongated by any distracting force, without tearing; but this circum-

uation
f articulate structure of the glands; but these researchers do not at all contribute to explain the mechanism of secretion. In the hope of accomplishing that object, anatomists began, as soon as the improved condition of the science furnished the means of prosecuting such investigations, to subject the various secretory organs to a very attentive and close examination, and endeavoured to view the nature of the acini, into which milk of the glands were essentially reducible. The aid of magnifying glasses, and of anatomical injections, was resorted to on this occasion; but the opinions of two individuals, who had devoted much time to the subject, were contradictory at variance, and gave rise to a controversy, which had, at least this good effect, that it occasioned a very thorough examination of the subject. Multrigh taught that the acini are hollow, that the arteriae distributed on their surface depoited the secreted fluid in their cavities, and that it is conveyed thence by an excretory duct, that the union of these tubes forms larger excretory canals, &c. He claims the mucous glands of the alimentary canal, mouth, &c. to be the most simple forms of glandular structure, and considers that the larger glands differ only in consisting of an aggregation of such simple ones. "Glandula, qua pateat, ufo phagae, integritate, et confluentia partes copiose citatus, et omum inter se implemns, et id e loco factum glandulae. Tact.

Von. XVI.

GLAND.

ance arises from the abundant cellular tissue distributed throughout their substance, and not from any peculiar property of their glandular tissue. Their lobes are separated in proportion as the intermediate cellular laminae are elongated.

The glandular tissue, which anatomists have generally called parenchyma, is disposed in three different ways. 1. In the subcutaneous, lacrymal, and pancreas glands, which are properly called conglomerate, the secretions are made of distinct portions, connected together by a loose and copious cellular tissue of which the textures, vessels and nerves. These are again made up of smaller lobes united in the same way; and the divisions are more easily pursued when water has penetrated into the connecting substance. Repeated divisions give us smaller and smaller component portions, till we come at last to very small bodies, still confpicionis to the naked eye, and called glandular acini (grains glandulares, Fr.) These component parts are firmer in proportion to their smallness, as they are surrounded and connected to the adjoining portions by shorter and shorter cellular substance. We can easily follow the 2d, 3d, and even the 4th division of these lobes with the naked eye. The acini are of a roundish figure and pale colour, and distinguishable from any thing of a muscular nature by the absence of fibres. When examined with magnifying glasses, they are seen divided into smaller portions by cellular interfaces, and we can hardly come to an end of these divisions, if we employ successively greater magnifying powers. 2. There are no traces of the primary divisions just described, but large and succeeding lobes, in the liver and kidneys. They consist of a uniform and even tissue made up of glandular acini, closely united together into one substance. The connecting cellular structure of the particles, if there be any, is very small in quantity and short; hence the facility with which those bodies may be torn, and the kind of granulations which their rupture produces. 3. The prostates, tonsils, and all the mucous glands, have no appearance either of primary or secondary lobes or acini. The first of these consists of a dense parenchyma: the latter of a soft and almost pulpy substance. They cannot be torn, like the liver and kidneys. Controversy concerning the structure of the glandular acini.—It is easy to proceed thus far in analysing the composition of the gland; but these researches do not at all contribute to explain the mechanism of secretion. In the hope of accomplishing that object, anatomists began, as soon as the improved condition of the science furnished the means of prosecuting such investigations, to subject the various secretory organs to a very attentive and close examination, and endeavoured to view the nature of the acini, into which milk of the glands were essentially reducible. The aid of magnifying glasses, and of anatomical injections, was resorted to on this occasion; but the opinions of two individuals, who had devoted much time to the subject, were contradictory at variance, and gave rise to a controversy, which had, at least this good effect, that it occasioned a very thorough examination of the subject. Multrigh taught that the acini are hollow, that the arteriae distributed on their surface depoited the secreted fluid in their cavities, and that it is conveyed thence by an excretory duct; that the union of these tubes forms larger excretory canals, &c. He claims the mucous glands of the alimentary canal, mouth, &c. to be the most simple forms of glandular structure, and considers that the larger glands differ only in consisting of an aggregation of such simple ones. "Glandula, qua pateat, ufo phagae, integritate, et confluentia partes copiose citatus, et omum inter se implemns, et id e loco factum glandulae. Tact.

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blood-vessels into the excretory ducts; * e.g. in the kidney and liver. As Ruyfch continued his investigations, he found that the bodies considered as glandular and hollow acini by Malpighi, are mere blood-vessels; after accurately infusing the livers and kidneys and macerating them in water, he found them resolved into small clusters of blood-vessels, and proved this so clearly by his preparations, that Boerhaave, who had been a warm defender of Malpighi's doctrine, in defence of which he wrote the Epilola de Fabrica Glandularum, adv. F. Ruyfch, was induced to renounce his opinion. The elegant preparations of Ruyfch, and his appeal to the evidence of dissection, and other anatomical investigations, brought most anatomists over to his opinions, which, indeed, are generally received in the present day. Haller gives the following summary of his opinions on this subject. "Vieceram nempe secretiones definitas, eorumque imprimis acini, glandulairum conglomeratas, meris compansi vaculis, cellulae telae conjunctae, eo cum vinculi robusti ut conflitut acini, aque fulmis, laxoribus fibris annexis, totus et integer deduci potuit. In quolibet pratera acino, vasaorum glomerus, eadem fententia, duces excretorius efi, plane ductuli, qui de arteriis minima, tanquam ramulis minor et fangunium impervius, decidere videtur, quae fabrica in reo certum repertur, in aliis quidem excretae communicae cum specie ex conjectura adhaerentes. Secretio adae a vulgari fanguis circuitus hactenus differt, quod in illa quidem arteria minima cylindricis, in venam fibras sequatur, ut amblorem continuetur, quae fanguinem recipere apta sit, in humerum vero ductus excretorius, rubro vaculo arterio minor, tanquam ramus ex eo vaculo prodret." Element. Physiolog. lib. 7. sect. 2. § 14. The opinions and arguments of Ruyfch may be collected in his answer to the letter of Boerhaave mentioned above, in some of his other epistles, and in various of his Thefauri. He has given several figures representing the distribution of the minute vessels in various organs, and proves satisfactorily that the bodies called acini by Malpighi are merely minute vessels; he throws this concerning the spleen and brain, as well as in the glandular vicera. On the subject of this controversy, we may observe, that its importance does by no means warrant the pains bestowed on it, and the noise made by the combatants in conducting it. The nature of the investigation, which is carried on entirely in the minute elements of the body, and proceeds far beyond the power of any infusive Philippics, and consequently is, as the great anatomists have been pleased to term it, concerning the whole mystery. Let us admit with Ruyfch that the excretory tube is continuous with the secreting artery; shall we then understand how such infinitely diversified products, all differing from each other, and from the blood, are formed from the common maps of that fluid? Shall we be able to point out the precise spot in the continuous canal where the blood ends, and the bile, urine, or milk begins? and to explain how the change is effected? If, on the contrary, we suppose, with Malpighi, that arteries, ramifying on small membranous cavities, deposit the new products in thse receptacles, our ignorance of the points in question is neither more nor less complete than in the other case. Too much labour has been already spent on these idle questions, and many anatomists have judged wisely in abandoning them, and in preferring the task of collecting facts concerning the natural and deformed structure and functions of our frame.

Thus the appearances, concerning the value of these pur-

The organization of all the glands is by no means so uniform as to admit of our referring the mode of glandular secretion to any one mechanism. The mammary and tellis do not resemble the texture of the organs already described. In both of these, which again are widely different in all their sensible properties from each other, there is a vast congregation of secretory tubes, infinitely convoluted, with vascular ramifications copiously distributed among them. In the ultimate elementary parts of these glands, as far as our senses can perceive them, we discover nothing but minute, perforated, and very slender tubes; which are particularly obvious in the country of tellis, with the tiny trace of Malpighian or Ruyfchian acini. In the breast, indeed, the existence of these bodies has been a matter of dispute, and arguments, not deficient in plausibility, have been adduced on both sides of this important question, which, like many religious mysteries, is involved in just so much obscurity, as to make it a very suitable subject for polemical ex-cretes.

The organs of the mucous secretion, in general, do not fall within the description already given of the glandular structure. These seem to exhibit, in many instances, a very simple form of gland, of which, however, the action is no more understood, than that of the more complicated kinds. They consist of small receptacles, lined by the membrane covering the part, receiving the secretion, and pouring it out by a single orifice in the centre. Very simple glands of this kind are seen at the root of the tongue; their figure is circular or elliptical; the cavity is lined by a thin membrane, surrounded by a pulpy vascular substance, which causes a superficial promincence, in the centre of which is a simple aperture, affording mucous on pressure after death.

In these membranes, the membraneous part is more conspicuous, and the glandular substance less considerable, or indeed hardly perceptible, so that the whole seems to be formed merely of membrane. These have been called cryptes, folliculi, &c. Their figure is generally circular or oval, and they are lined by continuations of the membrane, to which they belong. They are placed in the cellular substance, and may possess more or less of the pulpy vascular matter. They have simple excretory tubes, commencing from the hollow of the membranous cavity, and terminating by open orifices on the surface of the part to which they belong, as the mouth, fauces, trachea, or intestines. Pre-ßure forces the secreted mucus from the open orifice. To these claus may be referred the glands of the lips, cheeks, epiglottis, pharynx, and ephymus, thoes of the soft palate, trachea, stomach, and intestines.

These more simple kinds of cryptes or follicles are united in different instances, so as to compose larger masses. Sometimes they are simply contiguous, connected by loose cellular substance, and poises each its proper duct: * e.g. at the back of the tongue, and about the arystoid cartilages. Such have been called glandular congregrations. In other instances, numerous follicles, included in a common covering, deposit their mucus in one or more large cavities, into which several follicles open. The tonsils afford an example, and have been called glandular conglutinates.
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The secretion of mucus is often performed in a species of structure, which does not seem to possess any thing of a glandular nature: in small membranous canals, which will admit needles for about half an inch in length, ending by blind extremities in the cellular substance, and terminating by oblique apertures on the surface of the mucous membranes to which they belong. Neither acini nor round follicles can be discovered opening into such canals, which are technically named funnels or lacunae, and which, in the urethra, have a perfectly smooth surface. Some of these are simple, as in the septum narium, the urethra of both sexes, the entrance of the vagina, &c.; others are ramified, as in some inclusions in the male urethra; in the neck of the uterus, &c.

The glands, which produce various matters of an unctuous description, appear to be very simple in their structure, but they are mostly so small as to prevent us from entering into much detail concerning their organization. The serous glands of the ear are small round bodies, differing in the interstices of the cellular substance; and each of which possesses a duct, penetrating the integuments of the meatus auditorius, and ending on its surface by an open mouth. They seem to consist of simple membranous cavities. The organs, which secrete fibro-sebacous matter, in various parts of the integuments, differ from these in being much more numerous, and united by numerous vacular ramifications, opening on the surface of the part to which they belong, with or without the intervention of a simple duct. Where they produce a fluid which concretes, it may be expressed from them in the form of a slender white thread. The areola of the nipple, the nympha, and the other external female organs, the corona glands of the male, the nose, and particularly the cavity between its ala and the cheek, the upper lip, and the hollows of the external car, possess numerous glands of this description. The Meibomian apparatus of the eye-lids is only a rather complicated speciment of the same structure; several simple glands open into a common duct.

The prostate possesses a peculiar structure, which can hardly be referred with propriety to any of the species first enumerated.

The glandular tissue, cut in slices and dried in the air, loses its original colour, acquires a dark hue, and even a blackish tint in the liver and kidney, on account of the large quantity of blood which they contain: if the latter vessels are repeatedly washed before they are dried, they continue to appear moist. The glandular tissue, in its dried state, is remarkably hard and brittle. If kept moist and exposed to the air, it becomes putrid very rapidly, and exudes in that state a highly disagreeable odour. A greater quantity of amoniacal matter is formed. The liver is particularly distinguished for the insupportable stench caused by its putrefaction. The kidney goes less rapidly into that state. When boiled, the glandular substance produces at first a greasy fluid, which troubles the water uniformly at first, and is then collected in an abundant froth at the top. This product is most abundant in the present, the muscular, mucous, and cellular syphons; and last in the cartilaginous, tendinous, fibrous, &c. The froth produced by its boiling is of a deeper colour, and seems to contain more numerous principles, than that derived from the white organs.

Like all other syphons, the glands grow hard at the first periods of ebullition, but instead of becoming softer afterwards, as the others do, the continued boiling makes them more and more hard; so that after five or six hours of ebullition, their firmness is triple or quadruple that which belongs to them naturally. This phenomenon is most remarkable in the liver. When removed immediately after the first corrugating effects of the hot water, they do not display the elasticity which the other syphons possess at this time. A tendon or muscle in such a state, if drawn, returns itself immediately, while a piece of liver breaks. The absence of fibrous matter perhaps is the real cause of this difference. The sudden action of naked fire crisps and corrugates the surface, as in all the other solids, and produces a hard exterior crust.

Maceration in water produces different effects on the different glands. The liver refills longer than the kidney, which, after two months, is reduced to a reddish pulp swimming in the water, while the former still preserves its form and density, and had undergone no other change than from a red to a bluish brown colour. The salivary glands exhibit much of the whitish, unctuous and firm matter, which is seen in all cellular organs after long maceration. This does not arise from an alteration of the glandular tissue, but from the fat contained in the abundant cellular texture of these parts.

Acids act on the glandular tissue nearly as upon the others. They reduce it into a pulp, varying in its colour, and in the promptitude of its formation according to the nature of the acid employed. The sulphuric acts most quickly, and gives a black pulp, while the nitric renders it yellow. They act much more slowly on the glands after boiling than before. Generally speaking, the glands are much less digestible than most other animal substances, particularly in their boiled state; for cohesion produces in them quite opposite effects to those which it exerts on the cartilages, tendons, and all the fibrous organs, which are rendered less dense, more gelatinous and viscid, and more speedily dissoluble by the gastric juice. The glands would probably be digested more easily, if eaten raw. Liver is less digestible in proportion as it is longer boiled. Bichat made a comparative trial of it in a raw and dried state: the former was reduced into a pulp in the stomach of a dog, when the latter had undergone a very slight alteration.

Excretory tubes.—All glands have tubes for the purpose of conveying away the fluids, which they secrete from the blood; and these canals are only found in glands, their conformation belonging to that of the peculiar tissue of the gland. The excretory ducts have an uniform origin in all glands. They arise like veins, by an infinite number of capillary tubes, which appear to begin at the acini, where their exit is. Each acinus is linked to have an arterial and venous, as well as an excretory tube. Arising in this way from all the ramifications of the gland, they unite, in one or more considerabel tubes, which generally run in straight lines through the glandular tissue, unite to each other, and form at last one or more large tubes.

Glands are to be distinguished into three kinds, with respect to their excretory tubes. 1. Some transmit their secretion through several ducts, each formed by smaller ones, and opening near together, but distinetly, and without any communication. In some cases these separate apertures are found on a more or less distinct prominence, as in the breast, profuse, and sublingual glands. Sometimes the orifices are found in a depression, in a kind of cul-de-sac, as in the tonsils, the foramen cecum of the tongue, &c. 2. Other and numerous glands pour out their fluids by a single tube, and there is nothing remarkable in general in the orifice. 3. Some glands deposit the product of their secretion in a reservoir, where it is retained, in order to be expelled at particular times. Such are the kidneys, liver, and testicles. In this case there will be two excretory tubes: one to convey the secretion from the gland to the reservoir, and the other to transmit it to its final destination. These reservoirs are therefore evidently connected with the excretory tubes.
Although the two first classes of glands have no reserved, we may in some degree regard the different ramifications of their excretory tubes as supplying their place. These, indeed, as well as in the glands, which have reserved, are habitually full of the secreted fluid. Under whatever circumstances the glands may have died, we may always produce a considerable flow of prostatic fluid by pressure on the gland. The papilla of the kidney affords a useful on the surface of the liver, and the convolutions of the kidney, as the hepatic duct, and the lacrimal vesicles are full of milk, for which there is no other substitute. From variations in the quantity of fluid, in the latter instances, the greater or less size of the breast, during fasting, certainly depends.

It appears in general that the passage of the secreted fluids in the excretory duct is much slower than that of blood in the veins, or of lymph in the absorbing vessels. Ureine is constantly flowing through the ureters; but a much greater proportion of blood would pass through a vein of equal diameter, while the bladder is smaller. The rate of motion however varies under different circumstances, the former is carried much more quickly during a meal, and urine passes off much faster after watery drinks.

The size of the excretory tubes varies very considerably.

1. Whence several are produced from one gland, they are very small, and some times scarcely perceptible to the naked eye. They have no diaphragms, but communicate open immediately on quitting the gland.

2. Those which are large, bearing a proportion however to the size of the gland, excepting the hepatic duct, which is mostly very small in comparison to the bulk of the liver. They pass for some distance after quitting the gland, and are produced by the union of such tubes as belong to the left mentioned class; so that if their isolated excretory tubules were to be united together, a common flexible duct would be formed resembling the second kind. The pancreas is the only instance in which the common duct is concealed in the substance of the gland; and there is no other instance, but the teat, where it forms evaginations, so as to be much longer than the usual through which it passes.

Whatever the arrangement of the excretory tubes may be, they all pour their fluids either on the surface of the body, as in the serous and acinous glands, or into the breast, as on the surface of mucous membranes, as the mucous, salivary, pancreatic and hepatic excretory. The skin and mucous membranes, therefore, are the only parts which drain the ducts of the gland, excepting those on the external surfaces. The excretory ducts of the serous acinous glands would form an exception to this observation, if the glands existed. They never terminate in the cellular membranes, and if a communication should take place, by accident, the fluids are formed by the superfused vessels, or in urinary follicles; or inflammation occurs in the tissue of the extrava-ular duct, producing ulcers, which persist the cellular apparatus in a more extrusive inflammation. Thus the alimentary canal is admitted in as great a kind of general excretory structure, superior to those of the liver and pancreas, &c., and giving some rise to the fluids it conveys, it passed through these vessels, and, not to enter the general circulation as a separate, but to be assimilated to a very considerable quantity. The connecting vessels are very short and slender in the teat. In those glands, which have a dense parenchyma, as the liver, kidney, prostate, and mucous organs, there is very little cellular tissue, and the facility with which some of them may be torn. Their substance never contains fat. The secretions of the liver in various diseases does not invalidate this observation; for the fat then enters into its composition as an essential element of the organ, and is suffused in place of the colouring matter, which disappears; it is not contained in cells. That may be seen also in the interior of the kidney, but it is round the pelvis, and not the proper parenchyma of the gland. The tonsils, prostate, and mucous glands, never contain any. Serous fluids are never thrown out in the substance of glands, which have a loose parenchyma; they are not affected in cases of the most general and extensive anaemia. We cannot, however, doubt the existence of cellular or serous in such glands; mention is not made of it.

The excretory ducts, but one vessel, as mem-
The development of rectomatos tumours in the liver, of cossus cyst in the kidneys, and of hydrates in both, without the secreción being at all disturbed. The liver is sometimes encreased from the four-fold by internal tumors the surface of the falivary and lacrymal glands, the pancreas, &c. They inot run between the lobes, penetrate into the smaller divisions, and are finally disposed on the acini. The branches coming from different quarters arallomone freely in the gland.

Where the organ is surrounded by a membrane, as in the liver, kidney, saliv, &c, the arteries penetrate on a wholesale, generally at a more or less deep notch, and in a single considerable trunk, which, however, is sometimes previously divided into a few smaller branches. This part, in which the artery enters, is always the first to receive the action of external bodies; a remark which is common to all important organs, as the lungs, intestines, liver, &c. The convex surface of these, where the vessels are smallest, and where hemorrhage would consequently be attended with the least danger, is always turned outward. When it has entered the gland, the main artery quickly divides into various branches, which diverge and are subdivided as they approach the convexity. They have various branches in the body of the organ, as they proceed; and end by producing a large number of capillaries, covering the surface of the organ. Sometimes they come through, are visible on the surface, and ramify between it and the investing membrane. The most favourable method of observing the distribution of the arterial system in this organ is to inject them with hæmorrhage, and to destroy the animal substance by means of immorcellation in the spleen, or nicotine pads; a caust of the vascular system, even to its very minute divisions, may be obtained in this way, and such preparations, on account of their elegance, are contained in all cabinets. Raylech, who was remarkable for his dexterity in these processes, found that the small arteries were differently arranged in the different organs. In the kidney they are convoluted, fo as to form, through the whole substance of the organ, small granular bodies less than a pin's head, which are the acini already alluded to. The surface of the liver is covered, after a successful injection, with innumerable capillaries arranged in a filiated form, and giving the appearance of little tufts of minute arteries, when the part is corroded, which have been compared to canal's hair pencils; and this arrangement has been termed the pellucid. A similar disposition is observable in the spleen.

Some have conceived that the large arterial trunks of glands communicate to the organs an interior motion very favourable to the execution of their functions. These bodies are placed, for the most part, in the trunk, and therefore near to the heart; and their vessels generally enter after a short course, so that the impulse has been considered, from this cause, to be more powerful. The pulmonary artery is a remarkable exception to this observation, and the flowery of the femoral infection has been explained from this cause. We own that we cannot discover any very convincing argument in proof of these opinions. The veins accompany the arteries throughout, in their distribution to the glands; we have no distinct here of a superficial and deep-dilated set. The liver is the only example in which red blood enters on one side, and black goes out in the opposite direction.

Blood of the glands.—The quantity of blood contained habitually in these organs differs remarkably in the different parts of the body. 1. The conglomerate glands contain very little. It imparts no colour to these organs, which are whitish in their appearance, and only require the water to be changed two or three times in an experiment. 2. The mucous glands, prostate, and seminal vesicles contain a larger quantity. 3. The liver and kidney have such a considerable portion, that they differ visibly in this respect from the rest of the glandular system. They contain a large quantity even after death from hemorrhage, or when the glands are suddenly removed from a living animal. Hence, when we excise these organs, it is necessary to renew the water at least twelve times before it ceases to be bloody; when we preserve them in alcohol, long previous maceration is necessary, to prevent the spirit from becoming turbid by the blood. This large quantity of blood occasions the glands, new under consideration to be heavier than the other parts of the body; hence, too, their distinguishing color red, which is not more essentially inherent in their tissue, than in muscular surfaces or vessels: in fact repeated washing will blead in as essentially. The liver then exhibits a green appearance, which appears to be the proper colour of its tissues, as alike to that of the muscular fibre. The tip of the kidney often becomes red immediately by the blood. It retains a degree of colour after frequent removals of the circulating water; and the pulp produced by having it in water for some months, with frequent changes, will have the red tinct, although less deep than in the recent state. Does the state of the secretion influence the quantity of blood contained in glandular organs? 1 There more blood flow to the kidney, when the urinary fluid is separated suddenly, than when it profits off slowly? or is there less returned by the veins in the former case?

Nerves.—Glands receive two kinds of nerves. 1. The lacrymal and salivary glands, the tonsils, &c, are supplied almost exclusively from the cranial nerves. 2. The testicles, prostrate, and liver, derive nearly an equal portion from the brain and the ganglia. 3. The kidney and most of the mucous glands, &c, are almost entirely supplied from the ganglia. These nerves apply to these nerves only, which are unconnected with the arteries; for each arterial trunk penetrating a gland, is surrounded by a nervous network belonging to the system of the gland, and very manifest in the larger organs, as the liver and kidney, where theplexuses come from the familiar ganglion, in the salivary glands, where it is derived from the superior cervical, in the teal from the lumbar, &c.

The nerves are small compared to the size of the glands. We must not decide on this subject from those which enter the parotid and submaxillary; for the nerves merely travel those organs, leaving a few branches behind them. But the liver obviously produces as small a supply as any organ in the economy, which receives nerves at all. Nerves enter the glands, like the vessels; that is, they come in on all sides where there is no surrounding membrane; and enter at the notch in other cases. They divide and subdivide, as soon as they reach the gland, and are quickly lost. There are never any ganglia in the interior of the glands.

We know but little of the exciting and absorbing vessels in the substance of glands, where they are merely indifferent to the purposes of nutrition.

Properties of the Glandular Tissue.—1. Properties derived from their Organization.—These are very
very lightly marked in this sytem, probably from its texture not partaking at all of the fibrous nature. In order that an organ should be susceptible of elongation and subsequent contraction, without injury, its component particles must possess a certain degree of cohesion; and this attribute particularly belongs to fibre. The glandular system, too, is subject much less frequently to causes of dilatation and contraction, than those which are made up of fibre. Where the liver contains a large quantity of blood after death, in consequence of the various sytems being overloaded, its bulk remains the same; its substance is compressed by the vessels. The enlargement of the teatific in gonorrhoea, and of the parotid glands under certain circumstances, and their speedy subsequent reduction, prove that these organs possess a certain degree of extensibility and contractility.

Are the liver, kidney, and other internal glands subject to similar acute enlargements? The phenomena now alluded to may take place in the cellular tissue of the glands, and therefore suppose a less degree of extensibility in the proper substance of the gland than might at first have been supposed.

2. Vital properties of the glands, and physiology of secretion.—The remainder of the investigation is much more difficult than what we have already gone through. The nature and properties of the fluids, and the structure of the secreting organs, may be determined in a great measure by the evidence of our senses; but when we endeavour to explain why each particular fluid is separated by its respective organ, the determination of the question implies a knowledge of the hidden substance of the minute elements of our body, about which we must either be silent, or attempt conjectural explanation, at some risk of exposing ourselves. The object then is, to show, why, in the healthy state of the body, saliva, and no other fluid, is constantly separated from the blood in the parotid gland, bile in the liver, and urine in the kidney; and how it happens that the nature of the secretion never changes, so that urine should be formed in a salivary gland, saliva in the kidney, bile in the mammary glands, &c. The difficulty of the undertaking is increased, and the prospect of arriving at a satisfactory conclusion diminished, by this circumstance; that in the different classes of fluids, each is not constantly separated in an organ of a particular structure. If that were the case, it would only be necessary to determine the relation which the structure of the gland bears to the nature of the secreted fluid; but the very contrary is the case. Fluids of each kind are produced by every variety of glandular apparatus; thus water is formed by the arteries of the skin, without any glandular arrangement, by conglomeration in glands, in the inflance of the salivary apparatus, and by a glandular vicosus in the cells of the kidney: mucous is secreted by membranous surfaces, and by different kinds of glands; and lastly, oily matter are poured from the arteries of the cellular membrane, from various tubaceous glands, from the vesicles of the skin, from the liver, &c. Again, there are influences in the body, of organs, of which we should, à priori, have pronounced, without hesitation, to be glandular, and which yet perform no secretion. Such are the spleen and thyroid gland, to which we may perhaps add the thymus and renal capsule. The spleen is a remarkable instance of the arrangement of the minute arteries, called the penicillium, which is seen also in the liver, and considered to have much connection with the peculiar functions of the secreting organs. In this place, too, we should mention the curious facts, concerning the formation of certain fluids, under particular circumstances, by other glands than those which ordinarily produce them.

Haller has collected, in his great work, a vast number of facts of this description; of which, if we should reject all that may seem insufficiently authenticated, there will remain quite enough to prove the point decisively. To the chapter in which these details are contained, he prefixes this sentence: "Sine quilibet humor per quodcumque column separari potest," and the cafes which he cites, fully justify his conclusion. Paragraphs: "Quando habet duos repetitum, confabulat, non glandula unica aliis diversis humoribus, sed eorum secola commutare, sed citam per muci organa aquam, per muci, aquam et adipis eola lymphan et fanguium, per aquam, muci et lymphae vias adscip, bilem fanguinamque fecern, atque adae comitum, nullum in animato corpore separatorium organum effe, quod non omnium effa classes homo fluis com dominus fecernere quot." Element. Physiologib, cap. 1, § 9. When these circumstances are considered, it will very probably be suspected that the causes of the differences in the secreted fluids cannot be traced in the obvious structure of the glands; but that the reason why a peculiar fluid and no other is separated from each gland, in the healthy state of the body, lies much deeper, and shows from some conditions of the organs, which are inaccessible to our senses.

We shall endeavour to illustrate the subject as far as well authenticated facts will assist us, and shall mention the opinions which have been most prevalent on the subject. It will be an easier task to show how unsatisfactory most of these are, than to sublimate any thing more rational in their place. We proceed to point out the vital properties of the glands.

No part of the sytem produces animal contractility, or the power of voluntary motion. Different glands seem to be differently circumstanced with respect to the corresponding species of sensibility. The peculiar and oppressive sensation occasioned by compression of the teatific, is well known. Considerable and continued pressure on the parotid gland has produced great suffering; but large nerves pass through this organ. The liver may be injured in a living animal, without causing any of the usual signs of pain; and Haller makes the same observation concerning the glandular fluid in general, but his statement is not perfectly explicit: "Univera glandulae experience minime irritabiles videntur, neque vehementer aut morbos fermit, aut illatas a profectore injurias." Elem. Physiol. t. 2. p. 377. Stones in the kidneys often cause very severe pain. From these apparently contradictory circumstances, we can only conclude that animal sensibility, which is variously modified, may exist in organs, where certain agents do not excite it at all, while others develop it very readily. In fact, various morbid alterations render this property very manifest in the glands. The pain of inflammation bears, indeed, a peculiar character in the glandular systems; it is generally obtuse and heavy.

Properties of the organic life.—Sensible organic contractility does not exist in the glandular sytem; but the two other organic powers are exhibited in their highest state of development, and are almost constantly in operation, being concerned in secretion, excretion, and nutrition. Organic sensibility enables the gland to distinguish in the mals of blood those materials which are suitable to its secretion; and by its insensible contractility, it has the power of rejecting whatever is heterogeneous. The blood contains the materials of all the secretions, of the nutrition of all organs, and of all the exhalations. From this common reservoir each gland draws what is requisite for its secretion, each organ for its nutrition, and every serous surface for its exhalation. The peculiar mode of organic sensibility enables each living part to distinguish what its functions require. The whole business of glandular action rests on the two powers just mentioned;
mentioned; and as this action is nearly confluent, they are almost incessantly exerted.

It is evident that all glandular affections must imply a disorder in the powers above-mentioned; since diseases of an organ are particularly determined by alterations of the leading properties; of those which constitute the peculiar life of the part. Observation proves this; we see these properties, when augmented or diminished, produce on one side increased secretion, as in diabetes, mercurial salivation, cholera morbus, &c; on the other, a decreafe or even suspension of the function, as in acute diseases, where all the secretory tubes seem, as it were, closed for a time; for instance, in supplicative inflammation of the urinary organs, &c. On other occasions the nature of the glandular sensibility is changed, and it harmonizes with tabes which are not admitted in the healthy state; hence the innumerable varieties of the secreted fluids under circumstances of disease. The cystic bile in the dead body presents numerous varieties of taste, smell, colour, and consistence. The numerous alterations of the urine are very well known. The faff is less liable to change; but how different is it in many diseases of its ordinary condition. Nothing can lefs resemble urine or bile than the fluids often discharged from the bladder and liver: whence then arise these differences? From the variations in the organic sensibility bringing the part into a relation with those tabes which were foreign to it in its natural state. Thus the same gland, without any change in its structure, but merely by altered modifications of its vital powers, may be the source of infinitely varying fluids. Might not this be carried to so far as to allow that the kidney, by affuming a sensibility analogous to that of the liver, may actually form bile? why should it not secrete bile, since it does secrete other fluids so widely different from those from which they are derived? In the healthy state, the mode of sensibility in each gland is nearly uniform; and the secreted fluid is conveniently nearly the same in its composition and properties. But the mode is changed by numerous causes in disease. An hysterical attack comes on; suddenly the kidney refuses to transmit the principles which colour the urine, and that fluid is consequently discharged limpid; as the paroxysm subsides, the natural type of the sensibility is restored, and the urine has its accustomed characters. In an epileptic fit, a thick frothy fluid is discharged from the mouth in abundance; as the attack goes off, the falyre secretion returns to its natural state.

The various changes in the organic sensibility, and the insensible contraction of the glands, do not affect the function of secretion only; but when they last for some time, they influence nutrition also. From the disturbances of this process arise those various organic affections, of which the glandular system offers the most abundant harvest to the pathological anatomist. We cannot avoid noticing, in inflicting wounds, the numerous diseases observed in this part of the body compared to others. The glands, the skin, the mucous, serous, and cellular tissue, hold the first rank in this respect; and in all thee the two properties above-mentioned exist in the highest degree, and are called into action, not merely by nutrition, but also by various other functions, which reside in the capillary system, as exhalation, absorption, and secretion.

The preceding account of the physiology of secretion, chiefly derived from the "Anatomie Generale" of Bichat, seems to amount to little more than this, that each secretory organ produces its peculiar product, in consequence of its possessing peculiar vital properties, which, when variously modified under particular circumstances, enable the organ to secrete very different fluids from the blood. And this we believe to be a pretty correct statement of the extent of our knowledge of this subject. But anatomists and physiologists, not satisfied with this simple fact, have endeavoured to develop the exact mechanism of the process, and it will be necessary for us to recount some of their opinions. In all observations on this subject, it will be well for us to remember that secretion is not confined to the animal kingdom, but prevails also in the vegetable world. We frequently observe the sap giving origin to peculiar and different juices in the various parts of the plant, and reformers from analogy have gone so far as to admit the existence of a glandular system in vegetables. We shall be induced, by this circumstance, not to lay too much stress on the peculiar structure of the secretory organs in the more complicated animals, as essential to the business of secretion. Many of the facts already noticed, concerning the separation of perfectly similar, or at least very closely resembling fluids, by means of totally dissimilar organs, will tend to the same deduction. And this mode of argument may be still further supported by various examples in comparative anatomy; where we find fluids of the same class secreted in animals of different orders, in organs of very different external appearance. The kidneys of birds are really conlomerate in their structure; and a fluid, exactly resembling the pancreatic fluid of warm-blooded animals is formed by the tubular pyloric appendages, variously conlomerated in different genera of fishes.

Of the different explanations, by which physicians have successively attempted to elucidate the function of secretion, most are completely hypothetical and improbable. In most instances they have been ascribed to the various animal fluids being all contained in the blood; and secretion, according to this opinion, consists simply in their separation by means of the glands. Differences in the diameter, length, and folds of the vessels, and supposed varieties in the holes with which the glandular system is supposed to be perforated, have been employed as the means of rendering the mechanism of secretion intelligible; hence the expressions of sieves, filters, and strainers, so frequently employed in physiology. We are diverted from the necessity of commenting on the glaring absurdity of comparing a gland to a sieve or filter, and of deciding which of these mechanical explanations is the most exquisitely foolish, by the completely gratuitous nature of the fundamental proposition. The modern analysts of the blood have no longer even the shadow of an excuse for regarding this fluid as a mixture of all the animal liquors, and for supposing that it is formed of saliva, bile, gastric juice, urine, &c. since we can discover no trace of such fluids in it. Although all the elements necessary to form these products, as well indeed as those of the solids, are in fact found in the blood, they exist in it in a different state of combination. The blood is manifestly an homogeneous liquor, capable of forming all animal matters from the most transparent and pure water, as the cutaneous exhalation, to the firm fabric of the bony system; from it are formed saliva, bile, and urine; and it serves also for the nutrition of muscles, membranes, and nerves; but none of these modifications of animal fluid are contained in it perfectly formed.

Their precipitation, says Flourez, in the tissues to which they belong, cannot be regarded as a simple separation; since it is accompanied by a modification in the properties, nature, and composition of each. Thus the crystalline pulp is not exactly the same albuminous matter as that in the serum of the blood; the gelatine is not isolated in this fluid, as in the membraneous tissue; the mucin is not completely identical in its character with that which exists in the blood; and the phosphate of lime is not associated in the latter to the gelatine in the former, which unites its particles.
cles in the bony system. Hence secretion always implies some change or modification in the matter which results from its exertion. Compend. Chem. sect. 8. ord. 4. art. 5.

Another notion, as a definition of all solid formation is to be formed, i.e., that the blood undergoes certain changes as it arrives at the glands; that it affords a peculiar constitution before it partakes the organs. It has been asserted that the blood-vessels are arranged so as to produce particular modifications in the contained fluid, and that this is a distinction preparatory to the final process. "The hepatic secretion has been considered to afford the clearest example of such previous changes. The structure and number of the vessels which surround and enter the organ, the proportion of these which carry blood or white fluids, the different temperatures supposed to depend on the proportions, in a word, all those points of constitution which can possibly influence the nature of the blood, are said to be sufficiently diversified in order to produce in the chemical properties of the fluids a condition favourable to the formation of fat in the neighborhood of the salivary glands, of urine in that of the bladder, &c. This disposition, depending on the vascular apparatus, has been represented to consist particularly in the variation, acceleration, cooling or warming of the blood, or in the last, by absorption, some of its principal constituents. But what fanciful can produce these effects? Is not the blood now through the trunks which are going to the glands just as in other vessels? In short, what is the change? The imposition in question is a complete assumption not supported by a single fact, and contrary to observation as far as our knowledge hitherto extends. Thus, after drinking copiously of watery fluids, we find a much larger portion of urine secreted; and the cutaneous exhibition is often augmented from the same cause.

In our endeavors to discover the mechanism of secretion, it will be better to seek the most simple mode of this function. Now the evolution from serous membranes, and the mucous fluid covering many of the surfaces of the body, are examples of this kind. We can discover nothing in these organs but vascular ramifications united by cellular substance. Hagedorn holds in the dead body follow the same course which the secreted fluids follow in the living. And the same observation may be applied also to the case of secretions in some of the more complex instances. "Water," says Haller, "tinged with colouring matter, impregnated or oil of turpentine, thrown into the arteries of a young stork, and occasionally even fish, in the experiments of Forich and Albinus, have existed in numerous cases upon the skin, after the removal of the cuticle covering the water, so as to insist very closely the proceedings of nature. I have repeatedly been seen, coloured with blue, and injected into the lungs through the inferior cava, run out with much fluid from the trachea. In the vixen, in general, or at least in the cubs through the cutaneous patches. Gel de poisons and excreta have passed into the embolus of the external carotid from the arteries; in the same way injected water imitates the course of the tears, and exudes abundantly from the whole internal surface of the eyelids." Elemen. Physiol. 2 p. 374. Physiologists have indulged in considerable disputes concerning this kind of secretions. "Some," says Blumenbach, "assert that all separation of fluids from the mass of blood is accomplished merely by pores in the blood-vessels, and throes, as they say, of an inorganic nature; while others deny altogether the existence of secretory pores. I suspect that this difference of opinion must be resolved into a verbal dispute. On the one hand, I must confess, unequivocally, that to make any notion what form of inorganic pores in an organized body, since all the openings in these vessels must belong to their organic nature, and be regulated by their vital properties. On the other side I do not conceive that the orifices or pores in the coats of the vessels, the existence of which cannot be doubted, differ essentially, in regard to their functions, from the cylindrical ducts, in which secretion is performed in the conglomerate glands, and in the glandular vasa; since it is probable that the formation of fluids depends more on the vital properties than on the forms of the secretory organs." Institut. Physiolog. sect. 32. § 469, note b.

However simple the process of secretion may be deemed in the case just specified, and however closely the proceedings of nature may be imitated by the experiments with injections, we shall find ourselves entirely ignorant of the essential circumstances of the process; i.e., we cannot explain the formation of the new product from the blood, and the formation of such totally different new combinations in organs where no difference of structure can be detected.

Thee, who wish to see the various attempts at explaining the mechanism of secretion, may find ample gratification in the third section of the seventh book of Haller's great work: where he gives his usual detail of all that has been written on the subject. The reader will be very willing to spare us the task of recounting all these dreams, and the still more disgusting toil of refuting them. We shall merely mention one opinion, on which physiologists lay some fire on even in the present day. This refers the difference of the secreted matters to the peculiar arrangements of the minute arteries of the glands. Ruyfela, who exceeded in the art of making anatomical preparations, was led to remark, in his employment of injections, that the ultimate arterial ramifications differ in the different secretory organs, and indeed that there are characteristic differences in this respect in all the structures of the body. This explanation may possibly be true, and we cannot perhaps completely overthrow it; but this is all that we can say in its behalf. We must observe, in the first place, that a correct account of the facts, and an exact description of the different vascular networks, is yet a deformity for this question concerns the very smallest capillaries, from which the tubules conveying the new product commence. How the larger ramifications, in fact, for instance, as will admit several of these, do not differ sufficiently from each other to account for the diversity of the fluids produced in the various organs. Indeed similar vessels often produce the most opposite products. The structure of the cortex cerebri, of the pharynx, and of the placenta, is very much alike with the most dissimilar results. The veins, too, are arranged like the arteries, as we should conclude, certainly not for the purposes of secretion. Very different arrangements of the veins may be seen in various membranes which produce the same kind of exhalation.

There has been a scheme of the science of chemistry, in order to explain the nature of secretion, but so far as I know, hitherto
Gland.

Hitherto derived from this source in unfolding the mystery. That the changes, by which the new products coagulating the animal fluids are produced from the blood are purely chemical, cannot be doubted, but we are equally in the dark as to the circumstances which determine or modify these alterations. We cannot doubt indeed that the whole essentially depends on a vital power of which chemistry cannot neither detect the nature, nor appreciate the force. If, however, we cannot be too cautious in expecting from this science a development of the immediate agent by which secretion is effected, much light may, probably, be thrown on some parts of the subject by accurate chemical investigations. We may apply generally to the observation of Dr. Thomson concerning the kidneys: "the changes operated on the blood in the kidneys are at present altogether unknown, but they must be important. Provided the method of analyzing animal fluids was so far perfected as to admit of accurate conclusions, considerable light might be thrown upon this subject, by analyzing with care a portion of blood from the emulent artery and vein separately, and ascertaining precisely in what particulars they differ from each other." Sygum de Chemist., vol. 5, p. 749. Poureroy, too, in considering how far secretion admits of explanation on chemical principles, speaks rather of what may be done than of what has been effected in this way. "The hitherto chemistry can only furnish some general statements on this subject; and if we look to this science for an explanation of the causes and products of the secretions, and for a demonstration of what passes in every kind of secretion in particular, we must wait till the experiments are much more numerous, the investigations more exact, and the animal analyses considerably multiplied. We must determine the temperature, confidence, and nature of the cerebral blood, of that in the vena portorum, and in the renal arteries, before we can understand the mechanism of the secretions performed in the brain, liver, and kidneys." Syll. des Conn. Chimi. v. 10, p. 385.

We should always bear in mind, in our attempts at chemical explanations of the animal functions, that the effects of the vital power are more particularly observable in counteracting and preventing the exertion of those affinities, by which dead animal matters are regulated; and consequently, that if secretion be an example of chemical affinity, it is so modified by the vital powers, that we can have very little hope of imitating it by experiments out of the body.

In what manner, and to what extent, are the secretions influenced by the nerves? The fact that glands have a supply of nerves, leads us to expect à priori that the effects of their operation will be very obvious; but the laws, which regulate this matter, are hitherto by no means clearly ascertained, and even the kind of influence is very obscure. There is a want of direct evidence, from experiment, on this subject. "I divided," says Bichat, "the nerves of the telencephalic in a dog: the gland inflamed and suppurred; but the latter occurrence shows that nervous influence is not necessary for secretion, since suppuration is accomplished in a manner analogous to that of the latter functions. Physicians know very well that paralyzed limbs may inflame and suppurate. Excision and expedition of the fermen may occur, when the lower half of the body is paralyzed, and when the nerves of the prolate at least must have entirely lost their influence. An example was related to me of a soldier, who contracted a gonorrhœa in this state. In complete paralysis of the bladder, mucus is still secreted in sufficient abundance. The nostril of the affected side is as moist as usual in hemiplegia; and an equal quantity of cerumen is produced in the meatus auditorius of the same side. The glands of the uvula do not cease to act, where that organ is paralyzed. After cutting the nerve of the eighth pair on one side in a dog, the air-vessels are equally full of mucus on that side. In the convulsed state of such parts as pousse glands, where the nerves of these organs must consequently be unusually excited, there is no augmentation of the secretion." Anatomie Generale, tom. 4, p. 624. We may observe further, that when the influence of the brain on the organs of the animal life is completely suspended in apoplexy or compression, where sensation and voluntary motion are lost, the secretions continue undisturbed. On the other side we may adduce numerous phenomena, which can be accounted for only through the agency of the nervous system. Under this head we may mention the flow of saliva on the sight of food, the increased lacrymal secretion produced by various affections of the mind, the suppressed discharge from the skin from the same cause. The urinary secretion is often suddenly affected in hypochondriacal persons; distempering news will occasion it to be secreted in great abundance, and of a very pale colour; and many remarkable instances have been recorded, where the biliary secretion has been decidedly and suddenly affected by mental emotions. It has been affected, but we know not on what authority, that a cow, after being milked by the same individual for a long time, will give much less milk, if the operation be performed by a stranger. These and other analogous facts have led many physiologists to admit of a nervous influence in the affair of secretion; the mode and degree of this action have been variously estimated. De Bourde ascribed the cause of the secretory organs was kept up by the nervous fluid; De Natura Humana, p. 122. Quevai reffered the difference of the secreted fluids to various degrees of sensibility in the secretory vessels; Examen du Eon. Anim. t. 3, p. 437. De Borde ascribed great influence to the nerves on the secreting arteries; Recherches fur les Glandes, p. 522. Stahl and his followers, who ascribed the power of guiding the vital motions to the soul (anima), conceived that it governed the humours of secretion also; and A. F. Hoffmann ascribes the difference of the fluids entirely to the anima, which regulates the secretory orifices by sphygmeters and valves, now closing them to prevent the entrance of particles heterogeneous to the fluid intended to be formed, and now opening them for the entrance of the suitable molecules; Nov. Hypothet. Phyllolog. p. 13. After recounting these opinions, Haller observes that they ascribe too great an influence to the nerves, and reminds his reader that secretions of various kinds are performed in plants, without the assistance of nerves; and that balsams, resins, gums, and coloured milky fluid is formed from the common liquor taken in by the roots of the vegetable. On this subject, we may observe, with Bichat, that the expression nervous influence has generally been used by physiologists in a very indefinite manner. When the irritation, division, or paralysis of a nerve supplying a voluntary organ interrupts, or entirely destroys its functions, we can observe and appreciate the influence of the nerves on such organs; but, with what propriety we can employ the same term to designate the power, which the nerves may possibly have over the secretory organs, when their division or paralysis does not at all disturb the functions of the part?

The secretions may be affected by the direct action of external irritants, although mechanical or chemical irritation in the living body produces no sensible motion or contraction of the organ. Thus, any acid matter will augment the flow of mucus from those surfaces which secrete it; and the slightest irritation of the conjunctiva increases the secretion.
of the lacrymal gland. The presence of food in the mouth excites the salivary organs; and the act of sucking or milking produces a secretion of milk, &c. &c.

The fame powers by which secretion is effected accomplish the passage of the fluid, when produced, through its excretory tubes: it is the innenfible organic contriuffility by which this is effected. Experiments on the ducts of glands in living animals, shew that they are not affected by chemical or mechanical irritation, and hence many have concluded that they possess no power of contraction; but the phenomenon render it necessary to allow them such a property, which may exist in parts, although the trials just mentioned should not render it obvious. External pressure on eXtraneous influence of other kinds have been referred to, in order to account for the expulsion of the fluids contained in excretory tubes, on the idea that these canals possessed no contriuffile powers in themselves. Such explanations are quite gratuitous assumpfions in all causes; and in many instances are totally, and manifestly inadequate, because the organ is exposed to no agency of the kind.

The secreted fluid in some instances is not conveyed immediately to the point of its ultimate destruction, but is either retained in the excretory tubes, or kept in particular referrers; and it has been supposed that various changes take place in its nature and properties under these circumstances. "Frequent sifmme," says Haller, "hoc mechanismo naturæ utitur, ut humorem secrerent retineat, pericicat, inspielt, ad definitus usus contemperat, legitima occasione efffant." Elem. Physiol. t. ii. p. 445. The urinary and gall-bladder are the most remarkable instances of this description; we may mention also the vesicle feminales, and the mucous ducts of the urethra and female organs of generation. That the secreted fluids in these, and in several other instances, are considerably altered after the time of their first production, cannot admit of a doubt, as mere inspection is sufficient to prove it; the particular changes produced in each cafe will be considered in the account of the various organs. The opinions entertained concerning the general effects of thefes referrers, are, that the fluids are impoverished by an absorption of the aqueous part, that they are depurified, or rendered more active, and variably mixed together; it is added, that their retention in the heat of the living animal body in many fancies renders them acrimonious, and that this change, in many cases, as in the bile and femen, promotes the views of nature. These notions are not very confident with each other, nor very clear in themselves; the latter suppoifion, concerning the acrimonious tendency of the fluids, is founded on the observation of the changes occurring out of the body, and is not at all warranted by observation of the living subject, in which chemical alterations are re-"filled by the vital powers.

We have every reason to suppose that much of the secreted fluids is taken up and carried into the circulation by the absorbents; but our knowledge does not enable us to determine the exact extent or nature of the modification, which the function of secretion undergoes from this cause. The experiments of Bichat prove that the various animal products, even those which we should at first have regarded as the most noxious, may be introduced into the venous system without effential injury to the animal; so that the blood may be deemed a common fluid, receiving and retaining various principles, which may vary according to circumstances. "I injected," says Bichat, "into the jugular veins of several dogs, cystic bile taken from other dogs opened at the same time. During the first days they appeared weary, did not eat, were very thirly, had a dull look about the eyes, and were constantly lying down; in a little time, however, they gradually recovered their original vigour. I have since employed human bile in similar experiments; the results were the same, except that hicouage and vomiting took place soon after the experiment. In one instance the animal died three hours after the injection; here I had used bile of an extremely deep black colour, like thick ink, such as is occasionally seen in the gall-bladder, and seems to form an essential part of the black vomitings observed in certain cafes. When similar trials were made with saliva, the consequent languor was less sensible. I then tried mucus of the nose suspended in water. Lastly urine itself, not of the aqueous kind, but that of coition, was employed; the consequent illneces was more severe, but one animal only died, and I suspect that this fatal event happened from the un guarded introduction of a little air at the time of the experiment." Anatomie Generale, t. 4. p. 587. He observes afterwards that the injection of any animal fluids into the carotid artery is immediately fatal, from the effects produced on the brain: but they may be thrown with impunity into other parts of the arterial sytem, as, for instance, into the intestinal sytem.

Sympathies of the glandular sytem—These may be divided into the passive and active. The glandular tisues is very readily influenced by various excitaments, either in the natural state, or in diseases, which constitute its passive sympathies. The cases in which the excitation of other organs augments glandular action, are particularly observable in the mucous system. Most of the excretory ducts open on surfaces of this nature; and examples of the observation occur in the flow of saliva determined by the presence of food in the mouth; in that of urine produced by catheters retained in the bladder; in the seminal excretion produced by irritation of the glans; the flow of tears from irritation of the conjunctiva or pituitary membrane; and in that of bile during the passage of the food into the small intestine.

The glandular system frequently exhibits passive sympathies in disease; the organic properties are brought into action under these circumstances, the animal sensibility being very seldom developed from to produce pain. The innumerable varieties in the quantity or quality of fluids separated by the glands under circumstances of disease arise principally from sympathetic influence. Thus the salivary apparatus moistens the mouth, or leaves it dry; fills it with a viscid or a thin fluid, &c. The mucous organs cover the tongue with matter of most varying consistence, thickness, and colour; and this occurs from sympathy with various states of the stomat. The liver, kidneys, and pancreas are influenced in very numerous ways; wherever any organ in the animal economy is affected, these are deranged; their secretion is increafed, diminished, or altered, and frequently even inflammation and suppression supervened. The affections of the liver from injuries of the head are well known; and the lacrymal secretion is variously modified in inflammatory and malignant fevers, fo as to produce various appearances of the eyes. Weeping in various mental affections is another example of sympathetic influence. The teficles and prostate exhibit fewer inftances of such sympathies, probably because their functions are so much more isolated. The relations which connect the breasts and uterus are remarkable, and frequently observed. In the fequel of considerable acute diseases, particularly fevers, the action of the glands is often conliderably affected, and copious evacuations, called critical, the nature of which is not yet clearly explained, take place.

The active sympathies are less frequent than those of the prece-
Gland.

The preceding clafs; but diseases exhibit instances of them. Inflamations of the liver, kidneys, salivary system, &c. shew various phenomena produced sympathetically in other systems.

Bichat, in his Anatomic Generale, gives the following view of the characters which distinguish the vital properties of the glandular system.

11. Peculiar vitality (via propria) of each gland.—The vitality of the glands, resulting from the preceding powers confedered in a state of action, is not uniform in the whole system; because the structure varies in every instance, and each tissue possesses a peculiar modification of vitality. Hence result many phenomena noticed by Bordet.

1. There are certain matters on which alone each gland can act in the natural state. Thus the salivary apparatus does not form bile, the liver does not separate urine, &c.; and on this principle the difference of the secretions is founded. In the same way causthides act particularly on the urinary organs; mercury on the salivary glands, &c. 2. Each gland has its particular mode of sympathy. Thus the liver acts especially on the brain, the kidney influences the stomatch, the uterus and breasts affect each other, &c. 3. Each glandular inflammation has a peculiar character; that of the kidney is different from that of the liver or testicle; the inflamed prostate has very different symptoms from the testis in such a condition. 4. Every gland has peculiar diseases, or tumeifs at least to which it is more exposed than others. Hydrothorax, which are very common in the liver, are never seen in the salivary glands or testicle. Sarcoccele is extremely common, while nothing is more uncommon than an enlarged parotid. The liver alone exhibits that peculiar alteration, which constitutes the fatty state; and is the most frequent finding. Physicians, who have not been conversant with the inspection of morbid cases, use the vague and insignificant terms of obtrusion and induration for every kind of glandular enlargement. The increase of size is the only common character of such affections, while the nature of the tumour is entirely different. 5. Every gland presents some peculiar modifications in what are called the critical evacuations, occasionally consequent on acute diseases. 6. The different vitality of the glands occasions them to act at very different intervals, in consequence of direct irritation, or sympathetic excitation. The lacrymal gland, for example, pours out suddenly an abundant secretion, when irritated; while the kidneys or pancreas can be excited only very slowly.

2d Character. Inactive state of the vital powers.—The glands are subject to habitual alternations of increased and diminished action. The animal functions are especially influenced by sleep, which completely suspends them. The action of the glands is only partially diminished at certain times, except in disease, when it is sometimes completely suspended. Bichat compares the sleep of the animal life to the intervals of intermittent fevers, where the apathy is complete; and the sleep of the glands to those of remittent fevers, where the symptoms are merely diminished in degree. Saliva flows into the mouth abundantly during malnutrition; it merely moistens the cavity at other times. The pancreas and liver pour out their secretions profusely, while the food is in the duodenum; they act much less intensely during the state of abstinence. The kidney is particularly exerted some little time after a meal. The intermissions in the action of the breasts are almost as complete as those of the organs of animal life. Every mucous gland has its particular period of secretion; it is, when the surface, on which the duct opens, is in contact with any substance either retained in the cavity, or passing through it. We must, therefore, form this notion of the office of the glands; that they constantly separate a fluid from the blood, but that they are more active at certain periods, and consequentlv furnish a more abundant supply.

This remittance of the glandular action, says Bichat, depends on a cause analogous to that of sleep, which arises, in the animal life, from the fatigue experienced by the organs of secretion and locomotion, after a continuance of action. The altitude, of which the glands are susceptible, is not generally marked by any painful feeling; yet there is in the breast, after long suckling, a kind of dragging sensation, and actual pain is felt in the testis after emolition has been repeated two or three times.

3d Character.—The vitality of the glands is never encroached on at the same time in the whole system. When one is in action, the others are in a state of remission. We might conceive, says Bichat, that there is only a determinate quantity of vital powers for the whole, and that one cannot be exerted unfailingly without a corresponding diminution in the rest. The digestive apparatus is accommodated to this law. At first the salivary system produces an abundant secretion; then the stomatch comes into action; thirdly, when the chyme enters the duodenum, the liver and pancreas are principally exerted; and lastly, the kidney exercises its peculiar office to evacuate the residue of the fluids. All the glands cannot act at once; as, in the external movements, certain muscles are always in a condition of repose, while others are contracted. The moat improper time for infection is during digestion, because the mucous, pancreatic, hepatic secretions, &c. milt then be performed at the same time with that of the testicles. In diseases, the secretion of one gland is increased at the expense of others. This character of the glandular system is only an example of the general character belonging to all the vital powers, by which, when increased at one point, they are proportionally diminished in some other situation. Hence large absceses, considerable tumours, and dropies are always attended with debility of the glandular action. On the same principle is founded the use of blister, foment, moxa, cauteries, &c. which do not act, as old physicians supposed, by evacuating any morbid matters, but by putting an end to the irritation in the diseased part, by means of that which they determine in some other organ.

4th Character.—Influence of climate and the seasons on the vitality of the glands. From the preceding character is derived another phenomenon, which may be considered peculiar to the glandular system; viz. that it is in general more active in winter than in summer, in cold than in warm climates. Warmth, by relaxing the integuments, increases the cutaneous discharge at the expense of that of the glands; while the action of cold is the inverse of the preceding. Hence the same fluid, introduced into the body, is expelled in summer by the skin, in winter by the kidneys.

5th Character.—Influence of sex on the vital properties of the glands. Is the vitality of these organs more active in the male than in the female? In those which are subservient to digestion, the lacrymal and urinary secretion, &c. the two sexes exhibit very little difference. In the generative system, the male possesses the addition of testicles and prostate, the female of mammary glands; so that here there is a compensation. But the influence of the former on the animal economy very much exceeds in its force that of the latter.

Development of the Glandular System.

1. State of this system in the fetus.—Although the secre-
G I A

GLANDS, considered as simple organs, have this peculiarity, that they contain no material substance in their unexcited state, but are in such a state as to yield, on excitation, a quantity of fluid or secretion, or even a gas. The glandular system consists of the following glands: the salivary (parotid and submaxillary), the sweat (or vellum), the sebaceous, the mammary, the prostate, the seminal vesicle, the seminal vesicle, the ovarian, and the testicular. These glands are arranged in a certain manner, and are situated in different parts of the body. The salivary glands are situated in the cheeks, and are responsible for the production of saliva. The sweat glands are scattered over the body, and are responsible for the production of sweat. The sebaceous glands are situated in the skin, and are responsible for the production of sebum. The mammary glands are situated in the breasts, and are responsible for the production of milk. The prostate gland is situated in the urethra, and is responsible for the production of seminal fluid. The seminal vesicles are situated in the pelvis, and are responsible for the production of seminal fluid. The ovarian glands are situated in the ovaries, and are responsible for the production of female sex hormones. The testicular glands are situated in the testes, and are responsible for the production of male sex hormones.

GLANDS, defined as complex organs, have this peculiarity, that they contain a material substance in their unexcited state, and that this substance is capable of being transformed into another substance by the action of the gland. The glandular system consists of the following glands: the liver, the stomach, the pancreas, the kidneys, the bladder, the heart, the lungs, the spleen, the thymus, the thyroid, the parathyroid, the adrenal, the gonads, the pituitary, the parathyroid, and the thymus. These glands are arranged in a certain manner, and are situated in different parts of the body. The liver is situated in the right upper quadrant of the abdomen, and is responsible for the production of bile and the detoxification of many substances. The stomach is situated in the upper left quadrant of the abdomen, and is responsible for the production of gastric juice and the digestion of food. The pancreas is situated behind the stomach, and is responsible for the production of pancreatic juice and the regulation of blood sugar levels. The kidneys are situated in the posterior part of the abdomen, and are responsible for the production of urine and the excretion of waste products. The bladder is situated in the lower pelvis, and is responsible for the storage and excretion of urine. The heart is situated in the left upper quadrant of the thorax, and is responsible for the circulation of blood. The lungs are situated in the thoracic cavity, and are responsible for the exchange of oxygen and carbon dioxide. The spleen is situated in the left upper quadrant of the abdomen, and is responsible for the production of red blood cells and the recycling of blood components. The thymus is situated in the posterior part of the thorax, and is responsible for the production of T cells and the regulation of immune responses. The thyroid is situated in the anterior part of the neck, and is responsible for the production of thyroid hormones and the regulation of metabolism. The parathyroid is situated in the posterior part of the neck, and is responsible for the production of parathyroid hormone and the regulation of calcium homeostasis. The adrenal is situated in the posterior part of the abdomen, and is responsible for the production of steroid hormones and the regulation of blood pressure and blood sugar levels. The gonads are situated in the pelvis, and are responsible for the production of sex hormones and the regulation of sexual function. The pituitary is situated in the sella turcica, and is responsible for the production of pituitary hormones and the regulation of endocrine function. The parathyroid is situated in the posterior part of the neck, and is responsible for the production of parathyroid hormone and the regulation of calcium homeostasis. The thymus is situated in the posterior part of the thorax, and is responsible for the production of T cells and the regulation of immune responses. The thyroid is situated in the anterior part of the neck, and is responsible for the production of thyroid hormones and the regulation of metabolism. The parathyroid is situated in the posterior part of the neck, and is responsible for the production of parathyroid hormone and the regulation of calcium homeostasis. The thymus is situated in the posterior part of the thorax, and is responsible for the production of T cells and the regulation of immune responses. The thyroid is situated in the anterior part of the neck, and is responsible for the production of thyroid hormones and the regulation of metabolism.
GLANDERS.

corrupt flamy matter, running from the nofe, of a different
colour, according to the degree of the malignity, or as
the inflammation has been of a shorter or longer continuance;
being white, yellow, green, or black, sometimes tinged with
blood.

Authors ascribe it to various causes: some to infection;
some to a disorder of the lungs; others to the spleen;
some to the liver; and others to the brain. After it has
been of a long standing, that the matter is of a blackish
colour, which is usually in its kit stage, they suppose it to
come from the spleen; and hence they call it the "measuring
of the chime."

Kernels and knots are usually felt under the euid in this
disorder; and as these grow bigger and more inflamed, so
the glands increase more. The progress of the disease is
extremely uncertain; as some horses will endure it for many
years, without any other obvious inconvenience than a slight
discharge and the enlargement of the glands under the jaws;
and inflances have occurred in which these symptoms have
disappeared for several weeks, and returned, perhaps, with
no augmented virulence. In most cases, however, the
course of the malady is more rapid; the bones and carti-
lages of the nose are speedily eroded by the malignity of
the ulcers, from which an absorption commences, and con-
veys the poison into the circulation, gradually and fatally
contaminating the whole frame. Neither the appetite nor
the condition of the glanderous horse suffers materially in
the early or mild stage of the complaint. When, however,
it has spread its dominion over the thoracic visera, forming ulcers
in the fibulence of the lungs and in the wind-pipe, great
pain and difficulty of respiration are experienced, the dis-
corder becomes more considerable, the appetite is injured,
and the body of the unfortunate animal exhibits a picture
of extreme distress; and unless the humanity of the owner
does not induce him to terminate his sufferings, the disease
will, by tardy steps, afford relief to the wretched animal by
diffusion.

M. La Folfe, farrier to the king of France, has taken
great pains, by repeated dilatations, to discover the source
and cause of this disorder, and to ascertain the proper and
efficient method of cure. He has distinguished seven diffe-
rer kind of glanders, four of which are incurable. The
firt proceeds from ulcerated lungs, the juridament matter
which comes up the trachea, and is discharged through the
nostrils, like a whitish liquor, appearing sometimes in lungs
and grunes: the second is a waiting humour, that usually
keeps horses at the denture of a disease caused by too hard
labour, and proceeds from the lungs: the third is a malign-
unt discharge, which sometimes attends the triangles,
falls upon the lungs, and is discharged at the nostrils: the
fourth is when an scarinous humour in the farcy isces
those parts: the fifth arises from a horse's taking cold: the
sixth is a discharge from the triangles, which sometimes
vent itself at the nostrils: the seventh, or real glanders, is
that above described.

M. La Folfe, after examining, by dilatation, the creafes
of glanderous horses, and making a strict scrutiny into the
state of the visera, affihed in his enquiry by ingenious
anatomists for the space of ten years, affirms this disease to
be altogether local, and that the true seat of it is in the
pituitary membrane which lies the partition along the
inside of the nose, the maxillary bones or cavities of the
check-bones on each side of the nose, and the frontal
sinus or cavities above the orbits of the eyes; that the
visera, as the liver, lungs, &c. of glanderous horses are,
in general, very found; and, therefore, that the seat of the
disorder is not in those parts, as many authors have af-
fected. He found these cavities more or less filled with a viscid
flamy matter; the membrane, which lines both them and the
nostrils, inflamed, thickened, and corroded with forbid ul-
cers, which, in some cases, had eat into the bones. He
observed, that, when glandered horses discharge matter from
both nostrils, both sides of the membrane and cavities were
affected; but when they ran at one nostril only, that side
only was found disfigurured; and if one gland only was af-
feft, the horse discharged from one nostril only: but if
both were affected, the discharge was from both. It has
been observed, that the glanders in horses very much refem-
bles a disorder in men, called asthma.

In this disease, if the matter sticks to the inside of
the nostrils, like glue or stiff paste; if the inside of the nose is
raw, and appears of a livid or leaden hue, and the matter
becomes bloody, ferial, and of an afid-colour; these symp-
toms are very unprevalent; but when only a limpid fluid is
first discharged, and afterwards a whitish matter, the gland
under the jaw does not much increase, and the disorder has
been of no long continuance, a speedy cure may be ex-
pected. The core of the milder kind of glanders may first
be attacked by injections and fumigations. When these
latter symptoms appear, the horse should first be bled, and
drawn in the common disorder of cold; and then, let an
emolient injection, to decoction of linseed, marsh-mallow, elder, chamomile flowers, and honey of roes, or such like, be thrown up as far as possible with a strong
fire, and repeated three times a day: if the running is not
lessened or removed in a fortnight by these means, a refrin-
rent injection may be prepared with tincture of roes, lime-
water, &c. and the nostrils fumigated with the powders of
frankincense, mastic, amber, and cinambrt, burnt on an
iron heated for that purpose, the fumes of which may easily
be conveyed through a tube into the nostrils. When the dis-
cede is inveterate, recourse must be had to the operation of
trepanning; which M. La Folfe performed on three horses,
two of which discharged from one nostril only, and the third
from both: he trepanned the two first on that side of the
head which was affected, and the other on both sides, and
found that the wound and perforation filled up with good
flesh in twenty-six days, and the horses suffered no incon-
venience from the operation. The method of performing this
operation will be understood by means of Plate XIX. After-
lay's, fig. 1, and the following explanation: B, B, are two lines
representing the bounds of the cerebellum, or back part of
the brain, which commences from the line D. C C is a line,
where the superior part of the fissus frontalis commences,
together with a view of the bottom of the fissus, terminating
between the lines D and E, where appears a fulness in the
form of a pear, which is the os ethmoides, or sieve-like bone
through which the olfactory nerves pass, communicating
feasibility to the pituitary membrane. E represents the be-
inning of the maxillary fissus, terminating at M: the fiened
space between these lines represents the great cavities. F is
a bony partition, separating this fissus into two parts that
have no communication: of which partitions there are some-
times two, represented by F and G. Some horses have ne-
ither of these. N shows the place of the cornets or horns;
O, the redounding; P, their middle part; Q, the lower part
of them; and M, the bony pipe or canal which guards the
maxillary nerve: A A is the septum parum, dividing the
nofe from top to bottom, and separating the two noftrils; L
shows the place where the trepan should be applied, when
there is reason to apprehend that the glands is fared into
the frontal fissus; L is the place where it should be applied

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Glanders.

to cleanse the maxillary sinus, though the round spot between D and E is preferable, because one orifice in this place will serve to wash all the parts, both above and below, with one injection. If it shews the place where another perforation should be made, as a drain for discharging the foul matter washed away by the injection; and this hole, kept open by a hollow leaden pipe, would, in all recent cases, be sufficient. I represent the injection thrown in by the syringe, which flows out by the orifice and the nostril K; and, during this part of the operation, the nostrils should be laid close. If there should be two bones in the maxillary sinus, it is absolutely necessary to pierce through both, with a filletor or sharp-pointed tuck, as in the figure. The trepan should be directed towards the interior part of the nose, to prevent its being obstructed by the roots of the teeth. K is the trepan, S the handle which turns it, and T the saw-part to be applied to the bone. The surgeon's trephine will answer the purpose for this operation; but before the instrument is applied, a circular piece of the skin, of about the size of half a crown, should be first cut off with the membrane which covers the bone. The syringe should be large enough to contain half a pint of injection. The injection itself should be of a deterrive nature, as a decoction of birth-wort, gentian, and centaury, or a quart of which may be added to two ounces of guaiacum and tincture of myrrh; and when the discharge abates, and the matter becomes of a thick consistence and white co'orn, this injection may be changed for barley-water, honey of roses, and tincture of myrrh; and for completing the cure, Bates's alum-water, or a solution of coecothor, vitriol, lapis medicamentosus, and such like, in lime-water, will serve to dry up the moisture, and to remove the tone of the relaxed glands. For this purpose Dr. Bracken recommends the following mixture: Take of alum and white vitriol powdered, of each one ounce; calamine them in a crucible; when cold, powder the cals, and mix it with a gallon of lime-water and a quart of vinegar, and decant the mixture clear for use. The perforations that are made in this operation should be kept open, after the use of the injection, by fitting to the upper one a piece of cork waxed over, and a hollow leaden tent to the lower, through which there will be a constant drain of matter from the sinuses; and both may be secured by a proper bandage. The growth of the flesh should be also checked by rubbing with caustic medicines, or applying the actual medicine. The cure will be expedited, by giving every day a quart or three pints of a strong decoction of guaiacum chips, by purging at proper intervals, and putting a rowel into the horse's chest; and if these fail, mercurials may be administered with the physic, and the alterative powders with lime-water may be given and continued for some time.

The following remedy is said to have succeeded, in fifty cases out of sixty, for curing the glanders, without trepanning. Keep the horse a day or two with small quantities of choice hay, and fedded bran; then blow up his nostrils as much as will remain, in fine powder, as will lie on a six-pence, evening and morning, giving him for drink small lime-water, during four or five days; then boil two ounces of clecampane roots in a quart of drink, till they mix, and give it once a day during three or four days more; then boil two handfuls of the white roots that grow on oaken pales, in two quarts of milk, till one is consumed; drain it and give the more, and give the milk full warm; repeat this for four or five days. About an hour after the horse has had his drink each day, take a piece of sweet butter, about the size of an egg, and about half an ounce of brimstone finely powdered, and work them well together; then take two clean goose feathers, as long as they can be procured, and make a hole in each of the quill ends, in which fasten two long threads; then anoint the feathers well with the mixture, and roll them in dry flour of brimstone; open the horse's nostrils, and thrust the feathers up into his head, fadening the threads to the top of his head, to prevent their dropping out; ride him an hour or two attending it, and let him stand half an hour after he returns to the stable before the feathers are taken out; pursue this course eight or nine days, bathing his head with camphorated spirits of wine, and afterwards confining his head over a tub of hot grains, that he may breathe the steam. A rowel may prevent a relapse.

After all that has been said, it is now generally allowed, that no effectual remedy for the glanders has yet been discovered. The operation of trepanning has never been attended with permanent success; and whatever relief has been obtained from the use of various medicines, it has been merely temporary, and the disease has been pronounced incurable. But though all attempts for curing the glanders have hitherto proved ineffectual, the inquiry should be pursued, and efforts for this purpose should be renewed till the veterinary's ingenuity and perseverance are crowned with success. The analogy subsisting between the glanders and the venereal disease has led some practitioners to recur to the use of mercury, but it has proved very partial. Professor Coleman mentions a single case which occurred at the Veterinary College, in which the glanders yielded to the treatment employed, which was that of repeated and long continued doses of calomel, carried to the extent of salivation. This solitary case led to many trials of a similar nature, but, unhappily, without the success which was hoped for by the professor, who exerted his wonted ingenuity to improve the hint which this single instance afforded. Others have made similar efforts in this way, with only a temporary abatement of the symptoms, but without ultimate success. Some years ago, great expectations were formed, from the use of the mineral acids in the venereal disease; and trials were made with these in some cafes of glanders, which were ineffectual. The late professor of the Veterinary College, M. St. Bel, made a variety of experiments for ascertaining the nature of this disease, and for investigating an effectual remedy, while he was professor of the veterinary school at Lyons; he has recorded the cases that fell under his notice, with his method of treatment, which was very diversified and multifarious; but he concludes with observing, "notwithstanding my failures, I think that a remedy may be found for the glanders." Many circumstances convinced M. St. Bel, that the virus of the glanders has greater activity in southern than in northern countries; and that its progress is more rapid in the mule and the ass, than in the horse; but that the former are not so subject to receive it by infection or contact as the horse is. The use of verdigris having been recommended by a professor of the veterinary art, Mr. Lawton, surgeon to the Oxfordshire light dragoons, gave this medicine a trial in two cases, those of a horse and mare, beginning with one drachm daily, and gradually increasing it to one ounce. But no beneficial effect was produced. Deflection of the horse after three months' trial proved no disease in the brain, but it was altogether continued to the septum of the nose and nostrils.

As the glanders is a disease of such virulence, known to be contagious in a high degree, and hitherto found to be incurable, it is of importance to distinguish it from other diseases to which the horse is subject. A cold, which has been sometimes mistaken for the glanders, may be easily distinguished from them. In colds, there is generally a certain
certain degree of fever, the eyes appear dull or watery, the appetite is diminished, and there is almost always a cough. If the glands of the throat should swell, they are not to closely attached to the jaw-bone as in the glanders, but feel loose and moveable under the skin; they are also generally in a state of active inflammation, feeling hot, and softer than in the glanders. In colds, both nostrils are almost always affected; in the glanders it frequently happens that the discharge is only from one. In colds, the nostrils are not ulcerated; in glanders this always happens, though at different periods of the disease. The strangles have been sometimes mistaken for the glanders; but in this disease the inflamed glands very soon suppurate and burst, by which all the other symptoms are generally removed, whilst in the glanders the glands seldom or never suppurate. In order, however, to avoid all danger, it is advisable, as soon as a horse is perceived to have a discharge from his nose, to put him into a stable, where he can have no communication with other horses. If the glands of the throat be enlarged and inflamed, apply a large poultice to them, tear the head three or four times a day, let the horse be well clothed, and give a fever powder every day, or once in 12 hours. By these means, the disease, if it arise from a cold, will soon be removed. When considerable ulceration is perceived in the nose, with the other concomitant symptoms of the glancers, the sooner the horse is destroyed, the better.

The most effectual method of purifying stables in which glanedered horses have been kept, is to remove, or carelessly scrape, and afterwards scour with soap, sand, and boiling water, every thing on which the horses may have deposited any matter, and afterward to cover every part of the stable with a thick coat of lime and size. It is a common practice with the owners of horses, when they have had any one of them feized with the glangers, to bleed and purge the red, by way of prevention; but this method will serve rather to promote than prevent the disease, as it will considerably increase the action of the absorbent vessels, by which action the glanders are conveyed into the lymph.

GLANDIUM, in Surgery, a name sometimes given to an excrecence near the anus.

GLANDORE, in Geography, a harbour of the south of Ireland, in the county of Cork: it is a little to the west of Ros, and has the village of Myros at the extremity of it.

GLANDORP, Matthias Loutis, in Biographia, a physician, was born at Cologne in 1592. He studied first at Bremen, in Lower Saxony, whence his family originated, and afterwards returned to Cologne, where he commenced his medical pursuits; but, by the advice of his father's friends, he was soon sent to Padua, in order to reap the benefits of studying under the great masters, who at that time were so distinguished in medicine. He attached himself particularly to Fabricio and Spigelius; and he made such great progress in anatomy under the latter, that he was deemed qualified to give public demonstrations. Before returning to Germany, he received the degree of doctor in 1618. He determined to fix himself at Bremen, in which city he found every thing favourable to his views; and his successes in practice gained him so much reputation, that he was elevated to the most honourable offices. He was physician to the archbishop and to the republic, where he died in 1643. He left several works, adorned with plates, which contain many important observations on anatomy. These are

1. "Speculum Chirurgorum, in quo quid in unamque vulnere faciemur, quidem omittendum, praestat pars affecta anatomica explicature, observationibus ad unumquaque valvis pertinentibus adjectis, conspexitur ac protrahatur."


3. "Gazophylacium polyphili triumexculorum et feotonum referatur," ibid. 1653, 4to. — London 1653, 4to. — He made frequent use of the actual case in the treatment of the most common disorders. The whole of Glandorp's works were collected and printed in London, in 4to. in the year 1729, under the title of "Opera omnia, nunc simul collecta, et plurimum emendata." This collection includes also some curious tracts on Roman antiquities. Elov. Dict. Hist.

GLANDORP, John, a learned philologus, who flourished in the middle of the 17th century, was born at Munster. He studied under Melancthon, and became very distinguished for his critical knowledge. He was elected rector of the college at Hanover, but, upon some dispute, he quitted it in 1555, and retiring to Gollas, was followed by most of his scholars. In 1560, he was made professor of history at the university of Marburg. He died in 1564. His works are


GLANDULA, in Anatomy, the name of a gland. The word is a diminutive of the Latin glanis, acorn; and is here used on account of some external resemblance between the glands of the body and the fruit of the oak.

GLANDULA Guidonis, among Surgeons, is a tumor resembling a gland; soft, single, movable, with roots, and separate from the adjacent parts.

GLANDULE, in English, signifies a little gland. Thus the mygdalae, or almonds of ears, are by some called glandules.

GLANDULOUS, or GLANDULAR, something composed of glands, or that abounds with glands.

The breasts are glandulous bodies. The cortical substance of the brain is commonly reputed to be glandulous; though Ruych, from the discoveries made by his admirable injections, holds, that there is no such thing as a gland therein.

The ancients distinguished a particular kind of flesh, which they called caro glandulosa, or glandulous flesh.

GLANDULOSUS Dolor, glandulorum corpus, more particularly denotes the proflata.

GLANDULOSUS Rutos, among Botanists, such tuberose roots as are fastened together in large numbers by small fibres or threads.

GLANIS, in Ichthyology, a species of siturus, which see.

GLANOVENTA, in Ancient Geography, a place of Britain, in the 12th Iter of Antoninus, suppos'd by Horsey to be Lancaster, in the county of Durham.

GLANS, Acorn, in Natural History, a fruit contained within a smooth but hard bark, including a single seed; its hind-part being covered with a kind of cup, and the fore-part bare. See Acorn and Oak.

GLANS Marinus, a name given to a genus of shell-fish, more usually called balanus, and in English the centre shell.

GLAN Turgifera, a name given by Gfener, and some other writers, to a kind of figured foif, found usually among the trochita and entochia, and evidently appearing to have in some manner belonged to them. All the writers, who have themselves examined the places where the trochita are found, have mentioned these under the names of glades trochitifera, others under its determinate ones. Agricola:
calls them lapides inornes; and Lifter, after him, rude stones, having impreisions of the entrouci. See farther Philof. Trans. No. 100.

GLASS, P. in Anatomy, the rounded extremity of the organ. See Generation, organs of.

GLANSHAMMAR, in Geography, a town of Sweden, in the province of Nericia; seven miles N. E. of Oboce.

GLANVILL, Joseph, in Biography, was born at Plymington in the year 1656, where he probably received the early parts of his education; but he pursued his mature studies at Exeter college, Oxford. He took his first degree in the year 1677, and removing to Lincoln college, he gradually mander of arts in 1678, and was, about the same time, appointed chaplain to Francis Rouz, eqq. provost of Eton college. The death of his patron induced him, after a very short time, to return to Lincoln college, where he spent his time in literary and philosophical studies, till the restoration of king Charles II. He became acquainted with the writings of Richard Baxter, and was an ardent admirer of his preaching and religious principles. He is said to have been an eager republican in politics, but, whether this he the real fact, has been much doubted. Upon the re-establishment of monarchy and episcopacy, he conformed to the national church, a circumstance that did not in the least abate the esteem which Baxter had before manifested for him. He became a zealous convert to the principles of the philosophy, in opposition to the fyllem of Arilolote, and published a work in their justification, entitled "The Vanity of Dogmatizing or Confidence in Opinions." &c. This piece introduced him to the acquaintance of many of the person who afterwards formed the Royal Society. About this time Mr. Glanvill entered into orders, and was presented to the rectory of Wimbish, in the county of Essex, and in 1662 he was inducted into the vicarage of Fresno-Seldow, in Somersetshire. He published in the fame year, but anonymously, a discourse on the fundamental doctrine of the ancient Rhenish philosophers, which he endeavored to prove was not incompatible with revealed religion. It was entitled "Lux Orientalis; or an Enquiry into the opinion of the Eastern Sages concerning the Pre-existence of Souls; being a Key to unlock the grand Mysteries of Providence in relation to Men's Sin and Misery." Upon the establishment of the Royal Society, he published his former treatise, corrected and enlarged, under the title of "Scepsis Scientifica; or confessed Ignorance in the way of Science, in an Essay on the Vanity of Dogmatizing and confident Opinion." This work was dedicated to the Royal Society, and the author was almost immediately admitted one of its members. In 1665 he published his work, entitled "Some Philosophical Conclerations touching the being of Witches and Witchcraft." This performance, which is still regarded as a curiosity, though very little creditable to the judgment of the author, engaged Glanvill in a controversy which lasted as long as his life. He was now presented to the rectory of Bath, in which city he fixed his residence. Here he met with many opponents, who were apt to treat him but roughly, on account of his adherence to the new philosophy, which led him to draw up a small but elegant treatise, entitled "Plus Ultra; or the Progress and Advancement of Knowledge since the Days of Arilolote. In an account of some of the most remarkable late improvements of practicable useful learning, to encourage philosophical endeavours, &c." The author was violently attacked on this occasion, but he defended himself with spirit and success. His reputation was now firmly fixed, and he was frequently called upon to preach on public occasions. At a visitation of the diocese, he delivered a discourse which met with general approbation, and which was frequently re-printed: it was a defence of reason in the affairs of religion, against infidelity, scepticism, and fanaticism of all sorts. He next attempted to show the correspondence between religion and the new philosophy, in a discourse concerning the religious temper and tendency of the experimental philosophy which is prized by the Royal Society. "While," says one of his biographers, "he was entitling himself to the particular acknowledgments of the members of that body, by defending the reasonable tendencies and useful tendency of their pursuits, he also contributed to their collection of instructive and entertaining papers, some observations on the names in the Mendip hills, and on the natural history and springs of Bath, which were well received, and inferred in the Philosophical Transactions." In the year 1672, Mr. Glanvill exchanged his rectory of Frome for that of Strean, in the same county, with the chapel of Walton annexed; and about the same time was made one of the king's chaplains. In 1676, he published his "Essays on several important Subjects in Philosophy and Religion," consisting of the principal of his former pieces, revised and improved, with a treatise, entitled "Antinomian Theology and Free Philosophy." Two years after this, his "Essay concerning Preaching" came out; it was written for the purpose of diffusing the younger clergy from that affection of wit and fine speaking, which began to be fashionable in those times, and to recommend and enforce a plain and practical method of enforcing the moral duties of the gospel, as the true eloquence of the pulpit. The last work of this worthy divine, was entitled "The zealous and impartial Protestant, shewing some great but least needful Dangers of Popery." Mr. Glanvill died of a fever at the early age of forty-four, and Dr. Hornbeck published a quarto volume of Discourses, &c. after his death, to which is prefixed an account of the author. As a preacher, Mr. Glanvill was eloquent and pathetic: in private life he was truly amiable and praiseworthy. He was author of various other tracts besides those already noticed, the titles of which are given in the Biographia Britannica. To this work the reader is referred for further particulars.

GLAREANA, in Ornithology, the name of a bird described by Gellner from the figure, and specified to be of a grey change and black belly; a kind of lark, the Alauda campfisaris; which fee.

GLAREOLA, a species of Pringa; which see.

GLAREOLA, in Ornithology, a genus of the Grallae order, founded on the natural family called by Brillon "Perdix de Mer," and also Glareola. The character of this genus confisits in the bill being strong, short, straight, and turned down or hooked at the tip; nostrils linear, and placed in an oblique position at the base of the bill; gape of the mouth large; feet four-toed, the toes long, slender, and connected at the base by a membrane; tail furred, and containing twelve feathers. The number of species, according to Gmelin, are three, namely, Atraica, Senegalensis, and Norvis, the first of which, however, comprises several remote varieties. Linnaceus described this as a species of hirundo, the second kind is a tringa of the same author, and the third, a gallinula of Ray. Species.

AETRICA. Above grey-brown; cellar black; chin and throat white; breast and belly reddish-grey. Gmel. Hirundo marina, Aldr. Hirundo riparia, Merg. Pratincola, Kran. Gallinula erythropus minor, Gmel. Perdix de mer, Buff. Sen. fuscarellus of Aldrocanus, Will. The length of this bird is nine inches; the bill black; with the base red; upper wing-coverts white; quill and tail-
tail-feathers dusky, the outer side of the first tail-feathers white; and the legs and naked part of the thighs in general red. The species inhabits chiefly the south of Europe, and the milder parts of Asia; towards the north it becomes more rare, from diffusive, and is very rarely seen to remote from the southward as Britain. It abounds most in the plains of the defers towards the Caspian sea, in the neighbourhood of the rivers, its food consisting of aquatic insects and worms.

One of the varieties of this species is called by Brillon Guaraola torquata, and by Buffon, "Perdix de mer a collier." The plumage beneath is white; the front black, with a white spot on each side, and the collar brown. Its size is rather inferior to the former, and the legs blackish instead of red. This, like the other, is a noisy, restless bird, and frequents the banks of rivers, aquatic insects constituting its principal food. The eggs are oblong, and usually about seven in number in each nest.

The bird called "Perdix de mer" by Sonnerat is another variety of this species; the lower parts of the plumage, and also the rump, are white; and the chin streaked with black, and surrounded by a black curved line. This was caught in the open sea, in the latitude of the Maldives islands, and lived a month at sea, with its crop filled with water.

Two other varieties occur in the East Indies, on the coast of Coromandel, and are likewise described by Sonnerat; the first of these is brown, the under parts, with the rump and base of the tail white; in the second, the tail-feathers are brown, having the outer ones marked with a white band.

SeneGalenis. Entirely fuscous. Gmel. Glaraola Senegalensis. Tringa fusca, Linnaeus. Perdix de mer brunus, Buff. Senegal pratitulico. Scarcely exceeds the former in size, bearing nine inches and a half in length, and inhabits Senegal. The same variety is found also in Siberia.

Newia. Brown, spotted with white; lower part of the belly and vent reddish-white, with black spots; bill and legs black. Gmel. La perdex de mer tachetés, Buff. Galbula malanopus, Rothmuller, Ray. Glaraola, Buff. Spotted pratitulico.

Size of Glaraola auricata. This variety is met with in Germany.

GLARIANUS, Henricus, Loritus, in Geography, furnishes no Glarianus. from the town of Glaris, in Switzerland, where he was born in 1588. He rendered himself famous by his knowledge of music, and belles lettres; but he may more properly be ranked among dilettanti theorists in music, than a musician by profession; and his abilities, as a scholar and critic, have been much less disputed by the learned, than his knowledge of music, by musicians.

He studied at Cologne, Basle, and Paris; his predecessor in music was John Cochlaeus; and in literature, Erasmus, with whom he lived in sincere friendship, and by whom he was warmly recommended, in a letter still extant, to the archbishop of Paris. He is called by Walther a philosopher, mathematician, historian, geographer, theologian, and poet; indeed, he distinguished himself in most of these characters. Gerard Vossius calls him a man of great and universal learning; and for his poetry, the emperor Maximilian I. honoured him with the laurel crown.

His famous treatise on music, is entitled GLAIANA, which implies twelve modes; to which number he wished to augment the ecclesiastical tones which had never before exceeded (hitherto, from the time of St. Gregory. In this, and a few more, adopted the opinion of Glarianus, but soon relinquished it, on finding that they had made no converts. Indeed, the whole twelve modes of Glarianus contain no other intervals than those to be found in the key of C and A natural, or in the different species of octave, in those two keys; and though his augmentation extends the compass of sounds used in the modes, it offers no new arrangement of intervals, as may be seen by his title-page, when it tells us that the authentic modes are D, E, F, G, A, and the plagal A, B, C, D, E, G; where we perceive that A, C, E, G, are repeated, by being made both authentic and plagal.

If, instead of twelve modes, Glarianus had augmented the eight to twenty-four, by affixing two to each semitone in the octave, he would have done real service to the music of his time; but his contemporaries were not yet ready for such an innovation, being still held too fast in the tramels of the church to dare use any other sounds than those which time had consecrated, and authority admitted within its path.

His book, however, contains many curious anecdotes and compositions of the greatest musicians of his time, which were excellent studies for his countrymen and contemporaries, and, if forced, would be still very instructive and useful to young contrapuntists. Glarianus died 1613, aged 74.

GLARIUS, or GLARUS, in Geography, a canton in Switzerland, formerly subject to the abbots of the convent of St. Gall, in Swabia, but possessing a democratic form of government, under a mayor, appointed by the abbots, but chosen by the inhabitants; till towards the latter end of the thirteenth century, the emperor Rudolph I. obtained the exclusive administration of justice; and soon afterwards his son Albert purchased the mayoralty, which had become hereditary, and reunited in his own person the whole civil and judicial authority. The government of Albert, and of his descendants the dukes of Austria, was arbitrary and oppressive; and therefore, in 1530, Switzerland, afflicted by Zuric, Lucerne, Uri, and Unterwalden, expelled the Austrians from the canton of Glarus, and re-established the democracy. Glarus then entered into a perpetual alliance with its deliverers, and was received into the Helvetic confederacy, with some restrictions, which were not abolished till 1550.

It was then the 6th canton, but afterwards became last in rank of the eight ancient cantons, as they were called. The people of Glarus enjoyed their liberties un molested till 1588, when the Austrians made an irruption into the canton, and pillaged the country and all the inhabitants. At this time 750 troops of Glarus, afflicted by the Swabians, compelled the whole strength of the Austrian army, and compelled them to retire. In the 16th century the reformation was introduced into this canton; but the Protestants and Catholics have been accustomed to live together on terms of mutual toleration and friendship: of late the number of Protestants has very much increased; and their industry in every branch of commerce is observed to be far superior to that of the Catholics. The government of this canton, previously to the French revolution, was entirely democratical; every person at the age of 16 had a vote in the "Landsgemeinde," or general assembly, which was annually held in an open plain. This assembly ratified new laws, had contributions, entered into alliances, declared war, and made peace. The "Landammann" was the chief of the republic, and was chosen alternately from the two sects; with this difference, that the Protestant remained three years in office and the Catholic two. The other great offices of state, and the bailiffs, were taken by lot from a certain number of candidates proposed by the people. The executive powers were vested in the council of regency, composed of 43 Protestants and 15 Catholics; and each set had its particular court of justice. This canton comprehends 336 square miles; and its population is estimated
estimated at 16,000 persons; its contingent to the army, under the old government, was 400 men. According to the division of Switzerland into 18 departments or cantons, in 1798, the canton of Glarus, together with the bailiages of Wallenstadt, formed the canton of Linth; but according to the constitution of the 29th of May 1801, Glarus, together with the bailiages of Sargans, Werdenberg, Gullen, Uznac, and Rappenfchwil, forms the eighth canton, and deputes five representatives to the diet.

This canton is entirely enclosed by the Alps, except towards the north; and there is no entrance but through this opening, which lies between the lake of Wallenstadt and the mountains separating this canton from that of Schwytz. At this entrance, the canton reaches from the banks of the Linth to the farthest extremity of its Alps, about 50 miles; forming a valley, which becomes narrower as you advance, and is fearfully more than a market shot in breadth at the burg of Glarus. It afterwards opens by degrees, and, about a league from this burg, is divided by the Freyberg mountains; at the point of this division, the two rivers, Linth and Serfi, unite. The hillocks of the Peak in Derbyshire, says Mr. Coke, are mere mole-hills to the Alps of Glarus. These stupendous chains of rocks are absolutely perpendicular, approach one another so near, and are so high, that the fun may be said to let, even in summer, at four in the afternoon. On each side are a number of waterfalls, which excite attention. The valley terminates in an amphitheatre of mountains, and the glaciers of the canton close the view. (See Linth.) All the houses in this canton, like those of Appenzel, are built of wood; large, solid and compact. with great pent-house roofs, that hang very low, and extend beyond the area of the foundation. The police in this democratical state is well regulated; nor does liberty often degenerate into licentiousness. Cattle, cheese, and butter constitute the principal commerce of the canton. The cattle are fed in summer upon the Alps; it is computed that 15,000 head of large cattle, and 4000 sheep, are fattened during that season upon the mountains belonging to the canton. The inhabitants also manufacture linen and mufkins. Among the exports, a confiderable article is slate, with which the canton abounds; the principal quarry being in the valley of Serfi, where large plates are dug up that serve for tables. These quarries once furnished Great Britain with plates for writing; but this branch of trade has been superseded by the great slate quarries in Caernarvonshire. The great part of this canton conflides of mountains, rocks, inaccessible forests, and barren heaths, covered with snow; and it is subject to frequent inundations, and to the devastations occasioned by tempests and falling rocks.

GLARNISH, a mountain of Switzerland; 7 miles W.S.W. of Glarus.

GLARUS, or GLARES, the capital of the above-described canton, situated upon the Linth. The town is large and populous; and the town-hall is a landfame frumace; 52 miles L. of Lucerne. N. lat. 26° 58'. E. long. 9° 3'.

GLASENDORF, a town of Bohemia, in the circle of Koeniggratz; 6 miles N.N.W. of Trutnov.—Also, a town of Sofia, in the province of Neiße; 11 miles S.W. of Potschau.

GLASGOW, a very populous, landfame, and regularly built city, is the county of Lanark, in Scotland; situated on the north bank of the river Clyde, which is navigable for vessels of 100 tons and upwards. In ancient times, and during the prevalence of the Roman Catholic religion, Glasgow was chiefly distinguished as an archbishop's see, and was of course principally under the influence of the archbishop and his inferior clergy. Their power seems in these days to have been civil as well as ecclesiastical; for the charters of the most ancient corporate bodies are held by this tenure, the civil magistrates being only noticed as of subordinate rank and authority, and the freedom fines, and other emoluments are expressly appropriated to ecclesiastical purpofes. The revenue of the diocese of Glasgow, if it may be estimated by the extent of lands subject to the payment of tythes, or (as they are called in Scotland) teinds, must have been very great; for those burthens extended over almost the whole of the counties of Lanark, Renfrew, Dumbarton, Ayr, Dumfries, and Galloway, comprehending the whole south-west district of Scotland, and perhaps a moiety of the most fertile land in the whole kingdom. Of this enormous revenue, since the reformation a small part, but now of great value, has been appropriated for the support of the university of Glasgow, a part of the payment of the parochial stipends, and a great part has reverted to the freeholders or their dependants, and these are constantly fluctuating as in other parts of the kingdom. The insurrections and civil wars, which devastated Scotland subjequently to the reformation, and previous to the revolution, having diverted Glasgow from all that attraction which it had acquired as the archbishop's see, and occasionally as the royal residence, it appears to have been only remarkable as the occasional scene of those sangunsary and ferocious contests for which the age was conspicuous. It fell into the hands of the regent upon the defeat and flight of the unfortunate Mary Stewart at the battle of Langfield, two miles south of the city. It was long afterwards battered and taken by Cromwell's army, and it was the refuge of the defeated party, after the battle of Bothwell bridge, fought between the regent (afterwards James II.) and the Covenanters. After the revolution it seems for many years to have been a place of little importance, polishing neither a sufficient degree of wealth or refinement to render it conspicuous for elegance or luxury, nor rich security or strength as to make it definable or important as a military poit. At the time of the Union with England, its whole population was estimated at only 14,000, a fact stated in the house of commons by Mr. Secretary Dundas, (now lord Melville,) in one of the debates when the Irish Union was in contemplation. Subsequently to the Union, the rife of Glasgow in commercial importance, even under the lucrative checks of the two civil wars in 1715 and 1745, of the vastly greater commercial embarrassment, occasioned by the supplantation of its colonial trade during the American contests, and all the subsequent hof
tilities produced by the French revolution, has been perhaps unequalled by any other place in the empire, or perhaps in the world. Its population, under the act of 1794, including its numerous suburbs, was returned at 94,000, and from the concealment which was practiced from the idle fears of ignorant people, many of whom foolishly imagined that cefus to be the precursor of a military conflagration, that number is supposed to be at least 30,000 short of the actual amount.

Different histories of Glasgow have been published. Of these, one published many years ago by Mr. McUre, one of the city clerks, was much esteemed, but is now considered as obsolete. Others have subsequently been written by Mr. Gibson, about 1774, and recently by Mr. Denholm, about 1796.

The limits of this article necessarily preclude the possibility of entering much into detail, nor would it be either amusing or instructive to the general reader. We shall therefore infer what remains concerning the present state of this
this great commercial and manufacturing city under the following general heads.

1. Situation and general state of the adjacent country.—

Glasgow is situated on the north bank of the river Clyde, in N. lat. 55° 52' and W. long. from the meridian of Greenwich 4° 30'. The extreme length from E. to W., including two suburbs, is nearly two miles, and its breadth from the cathedral or high church to the river about one mile. The central part of the city, that part which is upon the southern declivity of a hill. Perhaps no other town in Europe is, upon the whole, more regularly planned; for all the principal streets are either parallel or at right angles to each other. The chief streets are better paved than those of London, and generally wider; all the front buildings are of fine free-stone, which is found in great abundance in the immediate neighbourhood. The granite, or cobble-stone, for paving the carriage ways, is also very plentiful close by the town. The houses are very large and lofty, being more generally upon the French plan, where every floor forms a separate lodging, accessible by a common staircase, than upon the English, where one person occupies the whole premises. The more wealthy inhabitants, however, have almost universally adopted the English taste in building. In the old part of the town it is indeed much to be regretted that there are too few public streets, so that an immense number of buildings are crowded together, many of which are accessible only by narrow passages, which are very ill calculated either for free circulation of air, admission of light, or domestic cleanliness. In the modern buildings these inconveniences are avoided, and whatever inconvenience may remain, must rather be attributed to the habits or negligence of the occupants, than to want of facilities on the part of the architects.

There are many very fine public buildings in Glasgow, the most prominent of which we shall very briefly enumerate.

Churches.—The cathedral or high church is perhaps the finest specimen in Scotland of that species of architecture, generally denominated Gothic. It was founded in the year 1123, and consecrated in the presence of King David I. in 1136. This building is more similar to that of Litchfield, than to any other of the English cathedrals, but it does not appear to have ever been completely finished, and certainly until lately little care has been used for its preservation. After the reformation it is said to have narrowly escaped demolition from the misguided zeal of the people, who confounded the building itself with the religious or superstitious ceremonies which they had produced. It now contains two churches adapted to the Presbyterian form of worship, and the choir is used as a place of interment.

The burying vaults, or cemetery, were formerly occupied as another place of worship for the barony or country parish of Glasgow; but lately a new church has been erected for this purpose at the opposite extremity of the church-yard. The great aisle is very lofty, and in some degree resembles that of Salisbury. The church was dedicated to St. Mungo, or Kentigern, whose burying-place in one of the vaults is still shown.

The remaining churches possess in general little claim to architectural encomium or description. They are six in number, viz. the college, St. Andrew's, North Well, Iron, St. Enoch's, and St. George's.

St. Andrew's church is a handsome modern building, of Corinthian architecture, and is very familiar in appearance to the church of St. Martin in the Fields, Westminster.

St. Enoch's and St. George's are also handsome modern buildings. Besides the established or parochial churches, there are many dissenting chapels and meeting houses, some of which are very handsome and commodious.

Prison.—This is a large and very strong building, situated in the centre of the city, adjoining to the Exchange. The lower part is occupied by the council-chambers, and rooms for the magistrates and the city clergymen; the middle part of the building contains the close or lock-up rooms for those imprisoned upon criminal charges; and the two upper floors are allotted for the reception of civil debtors. The roofs are lofty, the apartments airy, and the building, upon the whole, commodious; but it is in compliance with an act of the legislature that the prisoners may have the benefit of fresh air and exercise, from which they are at present precluded.

Bridewell.—This is a large building which serves as a place of confinement, or penitentiary house, for persons of depraved habits convicted of petty offences. It is very well regulated, and every means of encouragement afforded for reclaiming the prisoners from their vices, and promoting habits of industry. Many, at the period of their confinement, have thus acquired and received considerable sums, besides the expense of their subsistence, which is deducted from their earnings.

Town Hospital,—for the reception of poor persons unable to maintain themselves. The expense of this establishment is defrayed by a tax or assessment on the inhabitants, and by the proceeds of the labour of those admitted, who are supplied with work suited to their respective abilities. The inmates are aged and infirm persons and destitute children; the latter are well educated, and when arrived at a proper age, the boys are apprenticed to trades and the girls sent to service. The economy of the house is superintended weekly by gentlemen who act in rotation. The whole is very well managed.

Royal Infirmary—a very fine modern building, from a plan of Mellis, Adams'. From 90 to 120 patients are generally under cure, but the house contains accommodation for a much larger number when required. It is supported by donations, legacies, and annual subscriptions; the funds at present amount to 10,000l. or 12,000l., besides what has been annually expended; the annual disbursement is about 800l. or 1000l.; the direction is vested in the lord provost, the dean of guild, convener of the trades, professors of medicine and anatomy, president of the faculty of physicians, member for the city, and eighteen directors, ten of whom are elected by the contributors, and the others by various public bodies. The directors elected by public bodies are, one by the council, one by the merchants, one by the trades, one by the university, one by the ministers of Glasgow, and three by the faculty of physicians and surgeons. The medical attendance is afforded gratuitously.

Theatre Royal.—This superb house was erected a few years ago by voluntary subscriptions, upon transferable shares of 25l. each. The total cost was upwards of 15,000l., part of which remains as a debt upon the property, the whole annual rent being appropriated for its gradual liquidation. The direction of the property is in sixteen directors, four of whom go out annually, in rotation, but may be re-elected. It is unquestionably the largest and most magnificent provincial theatre in Britain. The managers are merely lessees, and the lease is always given for a short period, seldom exceeding two or three years.

Concert and Assembly Rooms.—These rooms are also very splendid, and, like the theatre, were erected by voluntary subscription, upon transferable shares.

University.—The buildings of the university have been erected at various times, and in very different styles, cannot
be appreciated by any precise scale of architectural taste; but the whole has certainly an air of imposing grandeur, and is very well adapted in every respect to the purposes for which it is designed. It consists of four distinct courts, which communicate with each other, and is accessible from the high street by three gateways. Behind is a large garden laid out in lawns and shrubbery, with very fine walks; it is divided into three parts, of which one is appropriated as a botanical garden, another is open as a place of exercise and recreation for the students, and the third, in which the astronomical observatory is situated, is generally reserved as a place of retirement, for the professors, or of ammonium for their families and friends.

The university of Glasgow was founded in the year 1451, by William Turnbull, bishop of the diocese, and then confounded of a chancellor, a dean of faculty, a principal, who was also professor of theology, and three professors of philosophy.

The professors and lectures are now as follow:

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<th>Faculty</th>
<th>Appointed by the University</th>
<th>Professorship</th>
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<tr>
<td>Divinity</td>
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<tr>
<td>Church history</td>
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<tr>
<td>Oriental languages</td>
<td>-</td>
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<tr>
<td>Natural philosophy, or physic,</td>
<td>-</td>
<td>do.</td>
</tr>
<tr>
<td>Mathematics</td>
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<td>Moral philosophy, or ethics,</td>
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<td>Logic</td>
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<td>Greek</td>
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<tr>
<td>Humanity, or Latin</td>
<td>-</td>
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<tr>
<td>Civil law</td>
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<tr>
<td>Medicine</td>
<td>-</td>
<td>- do.</td>
</tr>
<tr>
<td>Anatomy and botany</td>
<td>-</td>
<td>- do.</td>
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<tr>
<td>Practical astronomy</td>
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</tbody>
</table>

| Lectures            | -                           | - do.         |
| Materia medica      | -                           | - do.         |
| Chemistry           | -                           | - do.         |
| Midwifery           | -                           | - do.         |
| Natural history     | -                           | - do.         |
| Elocution           | -                           | - do.         |
| Painting and drawing| -                           | - do.         |

The funds for the support of the university are in a very flourishing and prosperous state. Independently of the endowments derived from the students, salaries and commissidious hours are allotted to every professor, and these expenses are defrayed from the funds at various times granted to the university; of these, the funds or tythes of the parish of Govan, form a very prominent part. The students of the five junior classes, viz. natural philosophy, moral philosophy, logic, Greek and Latin, are distinguished by wearing gowns of scarlet frock; the students of the senior classes have no particular distinction of drest. The resident members of the university claim an exemption from all civil burthens and services, and generally from the jurisdiction of the city magistracy, but acknowledge that of the sheriff of the county, and of the supreme courts of Scotland.

The internal government of the university is vested in the principal and professors, who, in their juridical capacity, assume the title of regents. Their supreme court is a general assembly of the whole faculty, who, at a remote period, assumed the power even of capital punishment. The most severe sentence, however, which has been passed for many years, is that of expulsion, and even this has been very rarely exercised. An inferior court is the "Jurisdiction ordinaria," consisting of at least three regents, who determine offences against the general order and peace of the university, and punish by a pecuniary fine. Each professor also possesses the power of levying small fines in his own chapel for negligence, contumacy, or irregularity.

The number of students in the university was estimated at 500 thirty years ago, and this number is now greatly increased. The professors and students, when assembled for the election of a rector or any other general purpose, are divided into four nations, according to the places of their respective births, viz.

- Scoti—comprehending the natives of Scotland, and of the adjacent districts of Scotland south of the Forth.
- Transforti—natives of Scotland, on the north of the Forth.
- Rothi—natives of the west highlands of Scotland and of Ireland.
- Laudon—natives of the eastern districts of Scotland, of England, America, and the colonies. The votes of these nations are decided by a majority, and the majority of nations decides the question. In cafes of parity the decision is in the regents.

The university of Glasgow has recently received a most valuable acquisition, by the bequest of the museum of the late Dr. William Hunter, of London. For the reception of this valuable legacy, a very handsome building has been erected, where it is now arranged. The museum consists of a valuable collection of paintings, chiefly original; a very fine collection of anatomical preparations; a cabinet of medals, and a fine library. The medals are accounted of such value, that the trustees of the British museum are said to have offered 25,000l. for them, besides furnishing such duplicates as they possessed, and defraying the expense of an application to parliament for an act, to far to dissolve the teator's will. This liberal offer, however, was declined.

The public library of the university is also a collection of uncommon value. It consists of upwards of 6000 volumes, and many very rare and valuable manuscripts. In the faculty hall are some valuable paintings, particularly one of the "Martyrdom of St Catharine."

Among the celebrated literary characters, which have belonged to this university, the names of Dr. Cullen, Dr. Adam Smith, and the late professor Miller, are most recently conspicuous.

There are many other public buildings in Glasgow, of which it will be necessary to confine ourselves to very brief notices.

The Trades-hall is a fine modern building from a plan of Mr. Adams. It is used for the general meetings of the fourteen incorporated trades, and is also occasionally occupied for concerts, balls, and other public amusements.

The Merchant's Hall is an old building, remarkable for nothing but the spire, which is a very fine one. It is used by the body to which it belongs, in the same manner as the Trades-hall.

The Public Markets are very commodious, and consist of square-paved courts, surrounded by the stalls where the meat is exposed for sale. No cattle are slaughtered here, and they are kept very clean and regularly inspected.

The Barracks are situated in a large area walled round, and consist of three very large buildings, one of which is appropriated for officers, and two for non-commissioned officers and privates. Their complement is 1072 men, but they will lodge on emergency 4 or 500 more.

Town—
GLASGOW.

Town-House—a fine old building adjoining to the prison. Only one hall is retained by the body corporate. The remainder contains the Tontine hotel, which was enlarged by subscription upon lives. The coffee-room is, perhaps, the largest and finest in Europe. It is supported by annual subscription, the subscribers amounting to upwards of 1000, who pay one pound five shillings each.

Bridges.—Three of these are of stone, and a fourth was actually built in the year 1755, when the river rising rapidly, in consequence of excessive rains, it was swept away in one night when very nearly finished. The arches being very flat, and the extremities not sufficiently secured, the accident was attributed, by professional persons, to the lateral pressure. Its place has since been supplied by a very handsome wooden bridge for foot passengers. The two bridges highest upon the river are plain, but very well built and paved. The lowerr, or new bridge, is very finely executed, and is esteemed one of the most compleat specimens of this species of architecture in Britain.

Water-works.—The city of Glasgow, until lately, was supplied with water by pits-wells, and the water of these, although abundant in quantity, was of inferior quality both for washing and culinary purposes; as, besides other impurities, it holds in solution a considerable portion of marine acid, by which it is rendered hard and brackish. To remedy this inconvenience a public company was formed, who, at the expense of upwards of 60,000l., brought water filtered from the river into every part of the city and suburbs by cast iron pipes, and from these pipes into every house, upon receiving a moderate annual payment from the proprietor or lessee. The capital necessary was raised by transferable shares of 50l. each. The rapidity with which those shares were bought induced others to form a separate establishment, and to raise water also from the river for the supply of the city. The first supply is drawn from the Clyde by two large steam engines, into a reservoir about two miles to the eastward of the town. From this reservoir it is filtered into another, and from thence conveyed by the pipes to a third immediately contiguous to the town. The whole lower part may be supplied from this without further forcing, but to supply the higher parts, a portion is again forced by another smaller engine to a cistern on a higher elevation, which commands every part above the former level.

The western water-work company draw their supply from the river to cisterns situated on an eminence about one mile west of the town, where it is filtered, and conveyed by pipes, without requiring to be forced a second time. The inhabitants are left to their own free choice from which company to take their supply.

River Clyde.—The Clyde takes its rise about 60 miles to the south-east of Glasgow, in the same mountain which forms the sources of the Tweed and the Annan. Near the county town of Lanark, about 28 miles above Glasgow, it has three remarkable falls or cataracts, much visited by strangers. From Lanark to Glasgow it passes through a fine valley, richly wooded in many places, fertile and highly cultivated. From the new bridge of Glasgow, where it becomes navigable, until it terminates in St. George's, or the Irish channel, about 80 miles distant. About thirty years ago, Mr. Goldsmith, an eminent engineer, was employed by the city of Glasgow to deepen the river, from the Broomielaw or harbor, to the sea-port towns of Port Glasgow and Greenock, the former situated 21, and the latter 24 miles below the city. This he effected in a very judicious, although gradual and economical manner. The beneficial effects of his plan became soon apparent, having been, every successive year, improving, and must continue so for many years to come. He began by constructing, on either bank, projecting dykes, or jetties, into the river, at right angles, to the banks on either side, and placed at small distances from each other along the whole course of the navigation. These jetties intercept much of the earth and gravel washed down by successive floods, and thus supply the materials for ultimate construction without the expense of carriage. Besides this, a number of farmers are employed every summer season to drag the bottom of the river, and lodge the stuff which is withdrawn from the bottom between the projecting jetties. By the constant repetition of this simple process, a great part of the river is now contracted to less than half of its original breadth, and has gained above four feet of additional depth. As the tonnage dues, the greater part of which is appropriated for this purpose, now exceed 6000 per annum, these operations promise to be continued on a more extended scale than ever; and it is probable that in a few years vessels of large burthen may be brought up to the city. The largest hitherto brought up are about 130 tons, the depth of the channel being about nine feet at high water. The gentleman who now directs these improvements thinks, that in a few years this depth may be increased to 14 feet by the present plan.

It was lately proposed to improve the harbour by the construction of huge docks; but a difference of opinion having arisen respecting the cost, under which these improvements were to be placed, the scheme has been suspended, but it is hoped not finally relinquished. The tonnage dues are one shilling per ton on merchandise, eighteen pence on foreign produce, and four-pence on coals, brick, and other building materials. Manure, carried upon the river for the improvement of the adjacent country, is exempted from any tax.

The country stretching along the banks of the Clyde, for a number of miles, both above and below the city, is generally fertile, and, in most places, highly cultivated, and well enclosed. The parish of Govan, situated on the south bank of the river, is, perhaps, as highly improved as any district in Britain. Besides the natural fertility of the soil, this may be accounted for by the plentiful supply of coal, lime, and manure, which are supplied at cheap rates by water-carriage. It must also be greatly promoted by the circumstance of there being many landed proprietors, whose estates, although abundantly sufficient to maintain themselves and their families in comfort and affluence under their personal superintendence, are not so large as to induce them to relinquish the profits and emoluments of cultivating their own property, which, of course, derives the united benefit of their personal skill, industry, and capital, besides that emulation which a laudable spirit of rivalry excites among them to surpass each other. The higher lands, both to the north and south, are considerably inferior, both in soil and cultivation, to those in the valley. In every direction round Glasgow, coal, lime, and iron-stone are found in great plenty, and give great advantages to the agricultural and manufacturing classes of the community.

The suburbs of Glasgow, which form the chief residences of the operative tradesmen, are the following:

Cathcart—a very populous village, immediately adjoining to the city on the south-east, and bordered on the Green of Glasgow. This village contains upwards of 20,000 inhabitants, with many manufactories, distilleries, &c. The green serves both for pasture and for the purporses of washing and bleaching. There are a commodious washing-house, and fine walks for the recreation of the inhabitants. The dues of washing and pasture form part of the city revenue. The green contains upwards of 100 acres of ground.
G L A S G O W.

Bridgetown—another suburb adjoining to the former, and similar in every respect.

Greenock—a village on the opposite bank of the Clyde, governed by a chief magistrate, appointed by the council of Glasgow, and two resident bailies.

Jagelon, Bezwfield, Finnington, and Partick.—These four villages lie to the west of Glasgow, on the north bank of the Clyde; they also are residences for operative tradesmen, and contain several extensive manufactories, viz. three large cotton mills, an extensive printfield, and porter brewery, at Anderlon; a large and flourishing glass-work at Finnington, and the very large flour-mills belonging to the incorporation of bakers at Glasgow, at Partick, where are also the ruins of an ancient castle, formerly belonging to the archbishop.

Municipal Government of Glasgow.

This, as formerly remarked, in ancient times, was almost exclusively vested in the archbishop and chapter. Since the reformation, it underwent various changes during the successive alterations of government in Scotland at large. The last arrangement made by royal and parliamentary authority, was early in the 18th century, under William and Mary. It has since been modified by the authority of the Scottish convention of royal boroughs, who exercize this power without dispute. As at present constituted, the government of the city is vested in the lord provost, three merchants, and two trades bailies, the dean of guild, or president of the merchants, the convey, or president of the trades, the city treasurer, and master of the public works, twelve counsellors from the merchants, and eleven from the incorporated trades, in all 33 counsellors. To this body the regulation of all the public business belongs; the lord provost being president, with the casting or deciding vote in cases of parity. The courts of justice within the city are the following:

1. The circuit court of judicature, for the cognizance of criminal actions, which is held twice a year at Glasgow, for the counties of Lanark, Renfrew, and Dumbarton, generally before two of the lords commissioners, although any one of their number is competent. This court also decides appeals in civil causes from any of the inferior courts within the district.

2. The magistrates or town court. This court is held under the authority of the magistrates, assisted by the town clerks as legal afforers. The jurisdiction of this court extends to any amount subject to an appeal to the court of seisin.

3. The conscience court, for the decision of petty causes under twenty shillings, where the formality of an oath is dispensed with, or any written pleading.

4. The fitting magistrate also decides daily trifling claims under five shillings. The magistrates also exercize a criminal jurisdiction in petty crimes, and punish by imprisonment, pillory, and sometimes public whipping and banishment from the city.

5. The sheriff court, for the under-ward of Lanarkshire, is also held at Glasgow, before the sheriff substitute. His jurisdiction is equal to that of the magistrates, not only within the city, but the district. The decisions of this court are subject to appeal to the sheriff depute and to the court of seisin.

6. The justice of peace court also decides civil causes to a limited amount, and regulates disputes between masters and servants. The appeal from this court is to the quarter seisins, and finally to the court of seisin.

7. The small debt court is held by two or more justices, for the decision of causes under 10/.. No professional lawyer is heard here, and the pleadings are verbal. They review their own decisions upon appeal, provided the sum demanded for be lodged with the clerk of court.

8. The commissary court is the remotest of the bishop's courts. It decides for sums under 3/. 6s. 8d., and also in cases of defamation. Its jurisdiction extends over all the ancient bishopric.

Police Establishment.—This establishment was constituted a few years ago under the authority of a special act of parliament. The commissioners named in the act are, the lord provost and bailies, and twenty-four commissioners elected by twenty-four wards, into which number the city is divided. The qualification of a commissioner, is the occupation of a dwelling house valued at 15/. or upwards of yearly rent; and of a voter, that of any house at 10/. or upwards. The business of this establishment is the lighting, cleaning, and guarding of the streets, and suppression of quarrels, riots, and other breaches of the public peace. For this purpose a master, or intendt of police officers, and watchmen are employed. A magistrate sits every morning at the police office to decide upon those who have been apprehended during the night. Where the charge is serious, he generally remits the cognizance of it to the town court, and punishes petty delinquencies by a small fine. The expense is defrayed by a tax on the valued rents of shops, warehouses, and dwelling houses, by fines levied in the course of the year by the sale of manure, from cleaning the streets, &c. The maximum of the tax is from 6d. to 11d. per pound of valued rent, but much less has been generally found sufficient. This institution has been always hitherto conducted with the most vigilant attention to economy, and is very popular even among those of the citizens, who strenuously opposed its original adoption.

Commerce and Manufactures.—The commercial importance of Glasgow only began to rise subseqently to the Union, and had attained no very important extent until the colonization of North America opened a wide field for the exportation of British commodities, and the importation of American produce in return. Previous to the commencement of the American war in 1775, it had, however, engaged very extensively in the tobacco trade, for it appears that of 50,000 bales of tobacco imported into Britain in 1772, 49,600 bales were brought into the Clyde alone, and, in 1775, the importation was 57,113 bales.

The operations of the war necessarily put a stop to this intercourse, to the great loss of the merchants engaged in it; many of whom have never been able to recover their debts. Upon the restoration of peace in 1783, the trade with America revived, and continued again in a flourishing state, until again recently superseded by the American non-intercourse act. In 1783, the registered vessels of the Clyde, were 386, and their tonnage 22,896, and in 1803, the number cleared outwards and inwards was as follows:

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<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>At Greenock Inwards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign trade</td>
<td>406</td>
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</tr>
<tr>
<td>Coal and fishing</td>
<td>730</td>
<td>35,552</td>
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<tr>
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<tr>
<th>Description</th>
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<tr>
<td>Outwards</td>
<td></td>
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</tr>
<tr>
<td>Foreign trade</td>
<td>628</td>
<td>70,366</td>
</tr>
<tr>
<td>Coal and fishing</td>
<td>1016</td>
<td>45,659</td>
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<tr>
<td>At port Glasgow Inwards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign trade</td>
<td>613</td>
<td>18,722</td>
</tr>
<tr>
<td>Coal and fishing</td>
<td>182</td>
<td>7,726</td>
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<tr>
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<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Outwards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign trade</td>
<td>177</td>
<td>25,157</td>
</tr>
<tr>
<td>Coal and fishing</td>
<td>119</td>
<td>7,222</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25,157</td>
</tr>
</tbody>
</table>

Total 3095 238,799 17,077.
From this note some idea may be formed of the extent of the trade; but many of these vessels having probably made several voyages in the course of the year, it is not to be inferred that this number of vessels actually belongs to trades to the Clyde. The articles of exportation are chiefly British manufactured goods, coal, fife, &c., and the imports European, American, and colonial produce.

The city of Glasgow had also a very considerable commercial intercourse with the eastern parts of the island, and with the northern states of Europe, until this was suspended by the events of the war. This intercourse is carried on by means of the Forth and Clyde canal, which interfaces Scotland, and forms a junction between the eastern and western seas, some account of which has already been given under the article Canal.

The manufactures of Glasgow had obtained no very great extent previous to the commencement of the American war; although they had been progressively advancing during the whole course of the eighteenth century. So far back as the reign of Charles II. indeed, some attempts had been made to introduce the manufacture of soap, refining of sugar, and some other branches, all of which proved abortive, and were discontinued. The linen manufacture was the most extensive of the various attempts made, and the most successful during the time that it lasted. It commenced about the year 1725, and continued progressively advancing until it was almost entirely superseded by the cotton towards the close of the century. The cotton manufacture, which is now unquestionably the staple trade of Glasgow, was prosecuted to very small extent until after the year 1784, but when once introduced it advanced with unprecedented rapidity. It is impossible to ascertain with any precision its actual amount either in quantity or value at any given period for want of proper data. A computation in 1791 makes the number of looms employed 15,000, and the persons who earned their subsistence by various parts of the processes of spinning, weaving, bleaching, &c. 125,000. It also estimates the total value of the goods made yearly at 1,500,000/. The grounds of this calculation are not stated, and little reliance can be placed on it, for the value of cotton goods has fluctuated as remarkably as the quantity has extended.

Two manufactories of calico are carried on in Glasgow, but neither of them extensively. Indeed a much greater quantity of Staffordshire ware is used in the city itself than of the produce of either. Two or three rope works are also carried on, but to no great extent.

The printing of calicos and other goods is, however, a very extensive branch of the manufacture of Glasgow and its vicinity. The most extensive of these works, are those situated upon the water of Leven, in Dumbartonshire, about 18 miles distant. The extension of the cotton trade has also greatly improved and enlarged the number of dye-works, and the manufactures of chemical preparations for the various processes of bleaching, dyeing, and printing. These works are situated in the vicinity of the city, chiefly on the banks of the river Leven.

Of the chemical works carried on in Glasgow, some are peculiar to it.

The manufacture of the oxy-muriate of lime, in a dry form, for the purposes of bleaching, &c., is also almost peculiar to Glasgow. Its object is to decrease the expense of bleaching by the substitution of lime for potash. This article is made to great extent by Mr. Tennent the inventor.

Iron liquor, for the use of printers, is made here by various persons, and large alum works are established in the neighbourhood. Manufactures of red and white lead are also carried on.

Miscellaneous Remarks.

It will appear that the city of Glasgow has undergone three remarkable changes. Its first state was the residence of a great archiepiscopal see, and consequently it was for many ages entirely under clerical influence and control. Its first eminence as a commercial place arose from its favourable situation for commerce with the American and West Indian colonies, and through this traffic it made rapid advances in commercial importance during the whole course of the eighteenth century. One branch of this traffic being at least for the present suspended, it now depends chiefly on the other, and upon its manufactures for support. From the facilities of acquiring a good education, the inhabitants of Glasgow have generally added a considerable taste for literary attainment even to their commercial habits, and this style prevails, perhaps, in a degree superior to any other commercial place in Britain. The system of education is, however, rapidly adapting itself to the modern pursuits of the inhabitants, and more pains are now taken to qualify the rising generation for eminence in the counting-house than the cloister. However defirable a thorough knowledge of the principles of commercial economy, and the details of business may be in a commercial community, it is still to be hoped, that all the benefits arising from intellectual attainment will not be deemed altogether nugatory, and consequently neglected. In every situation of life, they are sources of rational and innocent amusement, and, in the wisdom by which commercial enterprise is peculiarly supported, may often prove of real benefit and utility to the possessor.

The city of Glasgow returns a member to the British parliament, conjunctly with the neighbouring burghs of Rutherglen, Ruthven, and Dumfartan.

Glasgow, Port, situated on the river Clyde, about 22 miles below the city, is a handsome small town, and was projected by the magistrates of Glasgow at the request of the merchants as a harbour for their ships and vessels. It is said that the first plan was to improve the harbour of Dumbarton for this purpose, but Dumbarton being a royal borough, the consent of its magistrates became necessary, and that when made, it was rejected by that body, who preferred the full enjoyment of their chartered privileges to the idea of falling into the mere fea-port of Glasgow, however much their wealth, revenue, population, and general prosperity might be benefited by such an union. If this were the case, it is one among the numberless instances where comfort and prosperity have been sacrificed to a mere empty title. The harbour of port Glasgow is good but shallow. The disadvantage of the bank, noticed in the article Greenock, is also much against it as a haven. At port Glasgow there is a custom-house, where the general customers of the Clyde are collected. There is here also a fine graving or dry dock, built by the merchants of Glasgow long before that of Greenock was executed, and this circumstance alone brought many ships up to this port which now come no further than Greenock. The situation of port Glasgow is more pleasant than that of Greenock, the country more level, and better adapted for cultivation. In other respects it is certainly less
Glasgow

of calculated for the general purposes of maritime traffic than its rival, and therefore there is little probability of its extension. Indeed the shipping belonging to Glasgow is certainly on the decrease, the foreign merchants finding it more for their advantage to freight or charter vessels for any purpose than to build or buy vessels of their own, which both confine and rob a considerable portion of their capital, and may, from the many casuals and fluctuations to which commerce in this eventful age is exposed, prove rather burdens to advantages, while the mere ship-owner, if deprived of a freight or charter-party at one port, may with greater facility seek it at another, than the perfon with whom freight is only a secondary and inferior consideration.

Port Glasgow is governed by magistrates, appointed by the council of Glasgow, and some resident magistrates. Its exports and imports have been already given and compared with those of Greenock under the article Glasgow, which indeed furnishes by far the greater part of the freight to and from both ports.

There are no manufactures here of any extent, excepting those which are to be found at almost all sea-port towns, viz. ship building and rope spining. Both of these are carried on to a very considerable extent. A work was erected some years ago for refining of sugar, and also a small cotton-mill, but neither have ever been prosecuted to any great extent.

A plan has been formed, and its execution is now begun, which in time may produce a great effect, both on this town and Greenock. This plan has for its object the formation of a more direct communication between Glasgow and the west sea, than the present circuitous navigation of the Clyde, by means of a navigable canal to be carried from Glasgow to Arrochar, near Irvine, which is about thirty miles farther down the river than the present seaports. This canal was projected under the sanction and patronage of the present Earl of Eglinton, (lord Ardrossan of Great Britain,) a part of whose estates lie in that neighbourhood. Its objects are two-fold. First, to facilitate the maritime intercourse of Glasgow and Paisley with the New World, by a more direct channel and better harbour. Second, to improve the agricultural and internal trade of Renfrewshire, as the northern district of Ayrshire, by forwarding means for the cheap conveyance of coal, lime, manure, and other heavy articles by means of the canal. Arrochar is situated not more than thirty miles from Glasgow, by the line of the projected canal, and therefore the carriage of goods will not be more expensive or tedious than by the Clyde, for the canal being free from the constant interruptions arising from the operation of wind and tide upon the river, the time of arrival and departure may be depended upon at all seasons and in all weathers. A considerable sum has already been sub-fired for the canal, and also, for the harbour, and from the well-known energy and activity of his lordship's general character, there is no reason to doubt that every exertion for its speedy completion will be used.

It is natural to expect that every opposition will be given by those whose local interests will suffer by the success of this undertaking, and who comprehend many wealthy and powerful classes; but whilst some oppose, others will find it their interest to promote it, and the competition must be ultimately advantageous to the general body, however it may terminate as to those more immediately interested.

The other part of the plan is the formation of an excellent and secure harbour at Arrochar, capable of receiving ships of large burthen, and this also is begun. The subsciptions for the two undertakings are conducted separately. The coast here is in some places reckoned dangerous during the prevalence of strong gales from the north-west, when vessels are making the land; but it is said that the bay of Lamlash, in Arran, will afford a safe and easy shelter within a few hours after, if this may prove to be the case. The survey, plans, and estimates for the canal and harbour of Arrochar were made under the superintendence of Mr. Telford. It must be perfectly evident that this canal will in all events produce much benefit as it passes through the most populous and flourishing manufacturing district in Renfrewshire.

Glasgow, a new county of America, in Newbern district, North Carolina, taken from Dobbs's county, bounded N. by Edgecomb, S. by Lenoir, E. by Pitt, and W. by Wayne.—Also, a town of New York, on the E. coast of lake Cayuga; eight miles S. of Cayuga.

GLASS, in the general acception of this term among Chemists, denotes any substance or mixture, earthly, faline, or metallic, which is reduced by igneous fusion to the shape of a hard, brittle, uniform mass, which breaks with a conchoidal fracture, passing into splintery, and with a high degree of luster. Most glasses of this kind are also transparent. See ViTRUvius, Vitrum, in a more restricted sense, and as the term is commonly used in the arts and manufactures, signifies that transparent, solid, brittle, facitious substance, produced by the vitrification of silicious earth with various salts and metallic oxides, which is applicable to innumerable purposes of ornament and comfort, as well as of scientific investigation and research.

As to the antiquity of the term glafs, Tarsus (Germ. c. 45.) and Pliny (l. xxxvii. c. 3.) inform us, that amber was called among the ancient Gauls or Germans by the name of glefum or gleffum; and from the similarity which glasses bore to amber with respect to transparency and brightnes, it acquired a name, which was, in all probability, originally the same. The word glefum denoted, without doubt, a shining; or transparent substance, as glefum expreses at present in the German language to shine; and our English word to glife is derived from it, and has nearly the same significance. Duncan says that some critics were of opinion, that the word glefum itself implied glafs rather than amber. The ancient Greeks, as it has been already observed, applied the same term (S. Vitrum) both to glafs and amber. The herb with which the Britons painted their bodies had also the name of glefum, perhaps from the shining appearance it might give to their limbs, or possibly because its ashes might be used in the making of glafs. The Latins called the same plant by the name of vitrum, the word they used to signify glafs. (Cesar, Bell. Gall. l. v.)

We find frequent mention of this plant in ancient writers, particularly Cesar, Vitruvius, Pliny, &c. who relate, that the ancient Britons painted or dyed their bodies with glefum, gradum, vitrum, &c. i.e. with the blue colour procured from this plant. And hence, as some have supposed, the facitious matter we are speaking of, came to be called glafs, as having always somewhat of this bluehupe in it.

Merret (Not. in Ant. Neri de Art. Vitrat,) gives us the following characters or properties of glafs, by which it is distinguished from all other bodies, viz. 1. That it is an artificial concrete of earth and sand, &c. 2. Produced by a strong fire. 3. When fused, tenacious and coherent. It does not break or confume in the fire. 5. When melted, it changes to iron. 6. Ductile, when red-hot, and fashionable into any form, but not malleable; and capable of being blown into a hollownes, which no mineral is. (See Ductility of Glafs.) 7. Frangible when thin, without annealing. 8. Friable when cold. 9. Always diaphanous, whether hot or cold. 10. Flexible and elastic. 11. Dissilable by cold and moisture. 12. Only capable of being graven, or cut with a diamond.
diamond or other hard stones, and emery. 13. Receives any colour or dye, both externally and internally. 14. Not discoloured by aquafortis, aqua-regia, or mercury. 15. Neither acid juices, nor any other matter, extract either colour, tare, or any other quality, from it. 16. It admits of polishing. 17. Neither loses of weight nor fulbance, by the longest and most frequent use. 18. Gives fusion to other metals, and softens them. 19. The most pliable thing in the world, and that which best retains the fashion given it. 20. Not capable of being calcined. 21. An open glass, filled with water in the summer-time, will gather drops of water on the outside; but so far as the water on the inside reaches; and a man's breath blown upon it will manifestly moisten it. 22. Little glasses balls, filled with water, mercury, and other liquor, and thrown into the fire, as also drops of green glafs broken, fly asunder, with a loud noise. 23. Neither wine, beer, nor any other liquor, will make it muddy, nor change its colour, nor ruffle it. 24. It may be cemented as stones and metals. 25. A drinking-glass, partly filled with water, and rubbed on the brim with a wet finger, yields musical notes, higher or lower, as the glass is more or less full; and this makes the liquor frisk and leap. See ARIONICA. For the electrical properties of glafs, see ELECTRO, &c.

GLASS, origin and history of. De Neri will have glafs as ancient as Job; for that writer, chap. xxxvii., ver. 17, speaking of wisdom, says, "gold and glafs cannot equal it."

Thus, we are to observe, is the reading of the Septuagint, Vulgate Latin, St. Jerom, Pindar, &c. for in the English version, instead of glafs, we read crysál; and the same word is done in the Chaldee, Arius Montanus, anid the king of Spain's edition. In other versions, &c. it is read flone; in others crysál: in the Italian, Spanish, French, High and Low Dutch, &c. diamond; in others, carbuncle; and in the Targum, looking-glass.

In effect, the original word is σκουλάθρον (σκουλαθρον), which is derived from the root zac, to purify, cleanse, stone, white, transparent; and the same word (Exod. xxv. 34.) is applied to frankincense; and rendered in the Septuagint peladion. Hence the reason of so many different renderings, for the word signifying beautiful and transparent, in the general, the translators were at liberty to apply it to whatever was valuable and transparent.

Herodotus (i. 3.) is, according to Dr. Falconer (Manchester Memoirs, vol. ii.), the most ancient writer (B.C. 440) who used the word σκουλάθρον, which is generally understood to signify glafs. But he evidently does not mean artificial glafs, nor crysál, but, most probably, somewhat of the tallow kind, or lapis specularis, which might readily be framed in such a manner, as to form a convenient transparent cask, such as the ancient historian has described. Arkophanes (B.C. 400) seems to be the next writer who mentions glafs: that poet, in his comedy called the Clouds, Scene i. act. 2, uses the word ὕππαλως, which is now ordinarily rendered glafs. He there introduces Strephias teaching Socrates a new way to pay old debts, σκουλάθρον, "by placing a fair transparent stone, fold by the druggists, from which the fire is struck, between the funny and the writing, and so melting away the letters thereof." This same Socrates calls χαλάθρον, which the Scholion on Arrostophanes derives from δραμαλον, from the likeness it bears to ice, which is rain, or water congealed; though, it must be owned, the word σκουλάθρον is ambiguous, and signifies ὑππαλώς as well as χαλάθρον; and Gorraus observes, that the ancients had a kind of yellow amber, transparent as glafs, called by some χαλάθρον.

Aristotle (B.C. 340) has two problems upon glafs: the first, Why we see through it? The second, Why it is not malleable? If these problems be Aristotle's, which the learned doubt very much, this would properly be the earliest testimony in favour of the antiquity of glafs. Theophrastus (B.C. 325) seems to have been well acquainted with glafs; for he describes it as having been made of the sand of the river Belus, which was called vater, to which he adds, that the common kinds are made with copper. The celebrated sphere of Archimedes (B.C. 250), if it be truly described, is a remarkable influence of the perfection to which the art of making glafs had been brought at that early period.

Lucian mentions large drinking-glasses; and Plutarch, in his Symposicon, says, that the fire of tannakim wood is the fittest for making of glafs.

Among the Latin writers, Lucretius is the first that takes notice of glafs: "Nil recta foraminis transt, quin fulcit vitri," lib. vi. v. 3. Dr. Merret, however, adds, that glafs could not be unknown to the ancients, but that it must needs be as ancient as pottery itself, or the art of making bricks; for scarcely can a kiln of bricks be burnt, or a batch of pottery-wares be made, but some of the bricks and ware will be at least superficially turned to glafs.

Hence, Ferrant. Imperialis, lib. xxv. cap. 7. "Glas, like the common kind, is found under ground, in places where great fires have been. Other glases are found in round clods, like fire-clods, some brittle, others firm, &c. This kind of glafs is wrought by the Americans, and used instead of iron. And no doubt but vivifications were more common in the ancient bricks than they are in ours; as they tempered their earth two years together, and burnt them better.

Virgil (B.C. 390) compares the clearness of the water of the Euxine lake to glafs. Horace (B.C. 36) is more express, and mentions glafs in terms that shew its clearness and brilliancy; and have been brought to great perfection. Carm. iii. Od. 2. Od. 13 In the time of Strabo, (A.D. 77) the manufacture of glafs was undoubtedly well understood, and had become a considerible article. Seneca (A.D. 65) was not only well acquainted with glafs as a substance, but also understood its magnifying powers when formed into a convex shape. Quesil. Natur. lib. iii. vi.

Pliny (A.D 77) relates the manner of the discovery of glafs: it was first made of sand, according to that author, (Nat. Hist. i. xxxvi. c. 66, &c.) found in the river Belus, a small river of Galilee, running from the foot of mount Carmel, out of the lake Cesarea. The part of the shore where the sand was dug did not exceed 500 paces in extent, and had been used many ages before by the same purpose. The report of its discovery was, that a merchant ship, laden with nitre, or fojil alkali, being driven upon the coast, and the crew going ashore for provisions, and dressing their victuals upon the shore, made use of some pieces of fojil alkali to support their kettles. By these means a vivification of the sand beneath the fire was produced, which afforded a hint for the manufacture. In proceeds of time the calx of iron, in form of the magnetic stone, came to be used along with the fojil alkali, from an idea of its not only containing iron, but glafs, in a liquid form. Clear pebbles, shells, and fojil sand, were also in many places employed for the same purpose. It is said, that in India pieces of native crysál were used for that purpose; and on that account the Indian glafs was preferred to any other. Pliny adds, that light and dray woods were used for the melting of glafs; to which they added copper from the island of Cyprus, and the fojil alkali, especially that which is brought from the East Indies. The furnaces are kept burning without intermission, that the copper may be melted with the glafs, and out of this compound are made mallees of a comne blackish colour. These lamps or mallees are
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again melted, and tinged of the colour required. Some of the idle pieces are brought to the flame required by blowing with the breath; some are ground on a lathe, and others are embossed in the same manner as silver. Sidon was formerly famous for these manufactures, as specula or looking-glasses were first invented there; "liquidum etiam specula excogitaverat." Such is the ancient method of making glafs, described by Pliny. In his time, it was made with sand found at the mouth of the river Vulturinus, upon the shore, for six miles between Cuma and the Lacinian bay. This sand was very fine, and was ground to powder with a ball or sphere and a mill. It was then mixed with three parts of the toffil alkali, either by weight or measure; and being fused, was conveyed in a liquid state into other furnaces, where it was formed into a mass, called "ammuniment," (or sand combined with the toffil alkali,) which mass was melted, and became then pure glafs, and a mass of white vitrified matter. The same method of making it prevailed in Spain and Gaul. Glafs was likewise made to imitate the lapis Obsidianus, a sub stance found by a person of the name of Obsidius, in Egypt and Ethiopia. This substance was of a very hard, yet obscure, transparent, and often placed among specula in the walls of rooms, to reflect the shadow of objects. It was also used for the same purpose as gems (probably for engraving upon) and even for statues. Pliny mentions, that he few flat specula of the emperor Augustus made of this material; and the same emperor dedicated four elephants made of the same substance in the temple of Concord. It seems to have been used from great antiquity; but in the time of Pliny the artificial imitation of it by glafs was used instead of the native material; and he intimates that the black colour was produced by some coloring ingredient. The Romans had likewise an opaque red kind of glafs, used for plates and dishes for the table, called "hematomin," one of various colors, called "myrrhinum," a white, a clear red, a blue, and indeed most other colours. Pliny observes, that no sub stance was more manageable in receiving colours, or being formed into shape, than glafs. The perfectly clear glafs, which bore the greatest resemblance to crystal, was, however, most valued. Nero gave for two cups, with two handles to each, and of no extraordinary size, "freeselvetis," or nearly 5000, almonds. The inferior kinds were not uncommon, as Pliny informs us, that the use of glafs cups had nearly superseded those of gold and silver. We shall here add, that Pliny knew the power of a hollow glafs globe, filled with water, in concentrating the rays of light, so as to produce flame in any combustible substance upon which the focus fell; and he also mentions, that some surgeons in his time made use of it as a cauticum for ulcers (I. xxxvii. c. 2.). He was likewise acquainted with the comparative hardness of gems and glafs. As he observes, that the lapis Obsidianus would not scratch the true gems; and he also mentions (I. xxxvii. c. 13.), the counterfeiting of the latter, in his time, as a very lucrative art, and brought to great perfection. He also says, that glafs might be cut or engraved upon by means of diamonds, which art is evidenced by the antique gems so frequently found (See Gæt.) Josephus, (Bii. c. 10.) mentions the sand of the river Delus, in Gaul, as fitting for making glafs.

The first time we hear of glafs made among the Romans was in the reign of Tiberius, when Pliny relates that an artist had his house demolished for making glafs malleable, or rather flexible; though Petronius Arbiter, and some others, assure us, that the emperor ordered the artist to be beheaded for his invention. In the time of Martial, (A.D. 81.) glafs was not only brought to great perfection, and in common use for drinking vessels, but was employed (as it seems) for bottles in which wine was kept, and likewise for pots to hold flowers. (Epig. I. lii. 22. 40. I. iv. 86.) Galen (A.D. 143) frequently mentions glafs in several parts of his works, and seems to have been well acquainted with the method of making it. Apuleius (A.D. 161) mentions the manufacture of glafs cups, in his time, as highly wrought and carved in various ways, and of great value. Alexander Aphrodisiensis (A.D. 214) a Greek writer, and a commentator on Aristotle, has several remarks on glafs respecting both its brittleness, especially on change of temperature, and its transparency.

The manufacturers of glafs formed a company at Rome, and had a direct affiliation to them, in the first region of the city, near the Porta Capena. A tax was laid upon them by Alexander Severus (A.D. 220) which subsisted in the time of Aurelian, and probably longer after.

Mr. Nixon, in his observations on a plate of glafs found at Herculaneum, which was destroyed A.D. 86, on which occasion Pliny lost his life, offers several probable conjectures as to the uses to which such plates might be applied. Such plates, he supposes, might be used for writing, or当作 looking-glasses; for Pliny, in speaking of Sidon, adds, "liquidum etiam specula excogitaverat," the reflection of images from these ancient specula being effected by beaming them behind, or tingling them through with some dark colour. (See Mirr.) Another use in which they might be employed, was for adorning the walls of their apartments by way of wainscot, to which Pliny is supposed to refer by his vitrea cannae (lib. xxxvii. cap. 25 § 64.). Mr. Nixon further conjectures, that these glafs plates might be used for windows, as well as the laminae of lapis specularis and phengites, which were improvements in luxury mentioned by Seneque, and introduced in his time, Ep. xc. However, there is no positive authority relating to the use of glafs windows earlier than the close of the third century: "Manifellus est," says Lactantius, "mentem eis, per oculos ea que sunt oppollia, tranfcript, quasi per fenaeiras in vaso ant speculairi lapide obtutxas." De Opticio D.4, cap. 5. See Phil. Trans. vol. i. art. 86. p. 601, vol. ii. art. 28. p. 125.

St. Jerome (Epig. A.D. 422) speaks of windows formed of glafs, melted and cast into thin plates, as being used in his time. Paulus Silentiarius, a poet and historian of the 6th century, mentions the custom of the window of the church of St. Sophia, at Constantinople, which windows were covered with glafs. Gregory of Tours (A.D. 571) laments the devastations frequently committed in the windows of the churches by the ravages of war. Johannes Philoponus, who lived about the year 650, or, as some say, a century earlier, not only speaks of glafs, but of the panes being fastened in with paffier, much in the same way as at present.

If the opinion of Pennant, suggested under the article Aquarium vivum, be well founded, we have reason to believe, that, long before the conquest of Britain by the Romans, the art of manufacturing glafs into such ornaments as beads and amulets was known among the Druids; and if the art was thus applied, it is not improbable to suppose, that it was employed for more important and useful purposes, as in the manufacture of glafs vessels. Nor is it likely that the Britons derived this art from the Romans, who preferred silver and gold to glafs for the composition of their drinking vessels. Besides, the glafs that was commonly used by the Romans was of an inferior quality, and appears from some remains of it discovered at their stations and
and houses to have confromd of a thick, sometimes white, but mostly blue-green, metal.

According to venerable Bede, artizans skilled in making glases were brought over into England, in the year 1674, by abbot Benedict, who were employed in glazing the church and monastery of Weremouche. According to others, they were first brought over by Wilfrid, or Wigfrid, bishop of Worcester, about the same time, or, as others think, at a later period, A.D. 726. Till this time, the art of making glases, or at least of applying it to this purpose, was unknown in Britain; though glase windows did not begin to be used before the year 1480: till this period they were very scarce in private houses, and considered as a kind of luxury, and as marks of great magnificence. Italy had them first, next France, from whence they came into England.

Leo Ollifens (A.D. 760) speaks of the windows in his time being made with glase-plates fixed in lead, and fastened together with iron. Ananias, an historian of Rome, who was librarian to the pope, mentions, that in the pontificate of Leo III. who came pope about the year 800, painted glases in windows was in use. The statutes of the church of Trujicier, in Lower Brittany, about the year 1156, speak of the windows of churches and chapels being ornamented with arms and military emblems, painted upon the glases in them. A charter of Richard II. of England, quoted by Rymer, (A.D. 1386), contains a paragraph in which is mentioned glases, together with the manufacture of it for windows.

Venice, for many years, excelled all Europe in the finenes of its glases; and in the thirteenth century, the Venetians were the only people who had the secret of making crystal-looking-glases, and which they performed by blowing, much in the fame manner as a considerabfe quantity of the common mirror-glases is now manufactured. The great glases-works were at Muran, or Murano, a village near the city, which furnished all Europe with the finest and largest glases.

The glas manufacture was first begun in England in 1557: the finer fort was made in the place called Crutchet Friars, in London; the fine flint glases, little inferior to that of Venice, was first made in the Savoy-house, in the Strand, London. This manufacture appears to have been much improved in 1635, when it was carried on with sea-coal or pit-coal, instead of wood, and a monopoly was granted to Sir Robert Manell, who was allowed to import the fine Venetian flint glases for drinking, the art of making which was not brought to perfection before the reign of William III. But the flint plates, for looking-glases and coach windows, were made in 1673, at Lambeth, by the encouragement of the duke of Buckingham; who, in 1670, introduced the manufacture of fine glases into England, by means of Venetian artizans, with amazing success. So that in the eighteenth century, the French and English have not only come up to, but even far surpassed, the Venetians, and we are now no longer supplied from abroad.

The French made a considerabfe improvement in the art of glases, by the invention of a method to cast very large plates, till then unknown, and scarce practised yet by any but themselves and the English. That court applied itself with a laudable induftry to cultivate and improve the glas manufacture. A company of glase-men was established by letters patent; and it was provided by an act, not only that the working in glases should not derogate any thing from nobility, but even that none but nobles should be allowed to work therein.

It was in the year 1665, under the ministry of the great Colbert, that a company for “blown-mirror-glasses” was first established near Cherbouy, in Normandy, on the plan of the Venetian manufacture; but the beautiful art of casting glases was invented in France about the year 1688, by a perfon of the name of Abraham Thivart; and a company was soon established for this branch of manufacture, which was first carried on at Paris, and soon after removed to St. Gobin, where it still exists in full activity, and unmindful of reputation. An extensive manufacture of this kind was first established among us near Prefet in Lambour, about the year 1775, by a respectable body of proprietors, who were incorporated by an act of parliament. They struggled for a considerable time with difficulties; but being nobly rehenced and encouraged by government, they have succeeded in producing plates, rivaling, if not surpassing in size, quality, or brilliancy, the most celebrated continental manufacturers. This company furnishes, at Albion Place, London, plates of various dimensions, from 12 to 144 inches in length, and from 10 to 72 inches in breadth; and also convex and concave mirrors, from 12 to 36 inches in diameter.

Glass, Ingredients of: The materials used in the composition are some saline substance and some sort of silicious earth.

1. The first ingredient we shall specify is flux or fluxes. The flux is that which will melt, and which is white and transparent. It is this that gives confidence and firmness to the glases. This is found principally in Italy, being a sort of stony substance called terrae; the next is pauca, or congola, a sort of pebbles found at the bottoms of rivers, and gathered for the Venetian manufacture out of the river Po, which are said not to be inferior in whiteness to abbeater.

Indeed, nothing makes finer and clearer glases than common flint, distinguished for this use by its clear transparency, black color; this, when first used, must be heated red-hot, and then immediately quenched in cold water. The heat whitens it, and the water cools it to split it in every direction, and facilitates the grinding of it. The charge of preparing this deters the glases-men from using it. The rounded fragments of quartz, found in the beds of rivers among mountains, are sometimes used in foreign countries, being first heated and ground to powder. Indeed, the preparation necessary for flour, in general, is to calcine, powder, and Pearce it.

Ant Neri observes, that all white transparent flones, which will not burn to lime, are fit to make glases; and that all flones which will strike fire with fuel, are capable of being employed in making of glases. But this latter rule, Dr. Meret observes, does not hold universally. Where proper flone cannot be had, find is used; and it is now almost the only kind of sublimation employed in the British manufactures of glases. The best for this purpose is that which is white, small, and thinning; examined by the microscope, it appears to be small fragments of rock crystal. For green glases, that which is of a soft texture, and more gritty it is to be well washed, which is all the preparation it needs. Our glases-houses are furnished with white sand for their crystal-glases from Lynn in Norfolk, and Maidstone in Kent, and from the western extremity of the Isle of Wight; and with the coarser, for green glases, from Woolwich.

2. The second ingredient in the manufacture of glases is an alkali, which is either soda, or pot-ash. It is always used at first in the state of carbonat, though the carbonic acid flies off in the process. For the method of preparing each, see Carbonat. These alkalis are used in different degrees of purity according to the required quality of the glases. The finest sort of glases requires the bell pearl-ashes, purified by solution and evaporation, to dry; but for inferior glases coarser alkalis, such as barids.
GLASS.

wood-ashes, and kelp, are employed. The ashes of fern will also yield a salt, which will make excellent glafs; and, moreover, the ashes of the cods and stalks of beans, as also those of coleworts, bramble buffalo, millet-rattles, rushes, cypresses, and many other plants, may be used for the like purpose, and after the same manner.

There are other fluxes used for different kinds of glafs, and for various purposes. Lime, in the form of chalk, is employed in the manufacture of glafs; but the mixture used only in small proportions; for an excess would act powerfully on the sides of the glass-pots, in consequence of the escape of the carbonic acid from the chalk during the fusion, and, besides, it would render the glafs opaque and milky in cooling, however clear it might be when hot. It is known by experience, that to 100 parts of flex and the requisite quantity of alkali, no more than about six or seven parts of quick-lime, or chalk, can be added, without affecting the clearness of the glafs. Borax is another very valuable flux; but its high price restricts the use of it to the finest kinds of glafs, and to those which are required to be free from specks and bubbles. A very small quantity of borax will correct any deficiency of strength in the alkali.

Of the oxys of lead, litharge and minium are found to be of singular use in the manufacture of glafs. Litharge is a powerful flux, and imports to glafs the valuable qualities of greater density and greater power of refracting the rays of light, and of bearing sudden changes from heat to cold, without being so liable to crack, and also greater tenacity when red-hot, so that it is more easily wrought. A considerable quantity of this oxys is contained in the finer glafs; such as the London flat glafs, and that which is used for the table, for lustres, for artificial gems, and for most optical purpofes. Glafs, however, that contains much lead, is extremely soft; and liable to be injured by hard bodies that come into contact with it; and it is also very fusible. It is also liable to be corroded by very acid liquors. Besides, the use of lead renders it difficult to unite the flex and alkali, that a piece of glafs shall be throughout of uniform densit. Another ingredient occasionally used in glafs is the black oxys of manganese, called "glafs-fop," from its use in clearing the glafs from any accidental fouls of colour, and more especially from the green tinge, owing to the presence of iron. Scheele and Bergman in their respective "Effays," have illustrated many curious circumstances that attend the use of manganese in glafs, which are particularly noted in Alkali's Dictionary. The manganese should be chosen of a deep colour, and free from specks, of a metallic appearance, or a lighter call; and it requires to be well calcined in a hot furnace, and then to undergo a thorough levigation. The effect of manganese in destroying the colours of glafs is accounted for by M. Montamy, in his "Traité des Couleurs par la Peinture en Email," in the following manner; the manganese destroys the green, olive, and blue colours of glafs, by adding to them a purple tinge, and by the mixture producing a blackish brown colour; and as blackness is caused merely by an aborption of the rays of light, the blackish tinge given to the glafs by the mixture of colours, prevents the re-diffuion of so many rays, and thus renders the glafs less coloured than before. But the black produced by this substance suggests an obvious reason for using it very sparingly in those compositions of glafs, which are required to be very transparent.

This purple colour may be corrected by charcoal, or in the glafs-house, by thrusting a billet of wood down into the melted glafs, which becomes charred by the intense heat, and causes the purple hue to vanish, with a slight effervescence of the glafs, and escape of numerous small air-bubbles. On the other hand, if a small quantity of nitre is added to glafs containing manganese, the purple colour is restored, or, if present, the discoloring effect of the charcoal is prevented, till the nitre becomes alkalized by the heat, and mixes with the other ingredients of the crucible. For the explanation of these phenomena, it is observed, that the oxyd of manganese gives the metal to such an extent as it remains in its higher state of oxygenation; but when in contact with charcoal, the latter partially deoxygenates it, carbonic acid gas is formed, the caufe of the bubbles observed on this occasion, and the colour is now lost. Nitre, on the other hand, is known to give out oxygen largely as soon as red-hot; and hence the manganese immediately retakes from this source the oxygen of which the charcoal had deprived it, and refumes its colouring power. The other substances which take away the colour from glafs, tinged red with manganese, are all the salts with the basis of sulphuric acid, such as gypsum, sulphate of soda, &c. and also sulphur itself; likewise the oxys of tin and iron, and of some other metals. Nevertheless these substances have this power only when in contact with charcoal. The tinging power of manganese is perfectly destroyed by the addition of arsenic in any form. Thus, a mixture of oxyd of cobal and oxyd of manganese, in the colouring state, is of a dark purple; but on the addition of any arsienit, or of white arsenic, the manganese is made inactive, and the proper cobalt-blue alone appears. Hence we perceive the necessity, when the red colour of manganese is wanted, to avoid any thing arsienical; and nitre is also generally added to keep the manganese always at the proper state for imparting its colour. The oxyd of manganese is a very powerful flux for all earthy matters; and this, as well as lead, gives a great density to glafs. The white oxyd of arsenic is another powerful and cheap flux in the making of glafs; but it should be very moderately used; for it takes a longer time to mix intimately with glafs, and to allow it to be perfectly clear, than any other of the additions commonly employed. For want of this the glafs has a milky hue, which increases with age; and when the arsienic is in excess, the glafs becomes gradually soft, and is decomposed. Besides, glafs of this kind is unsafe to be used in the form of drinking-vessels.

Nitre is also used, in small quantities, in the manufacture of glafs, and is designed to answer particular purpofes, some of which we have already specified. It not only serves to destroy the strong tinge of yellow which is found in glafs, prepared with lead as a flux; but in falcine glafs, it is requisite, in a smaller proportion, to render it sufficiently transparent, as in the case of looking-glasses, and other kinds of plates. For an account of Mr. Dollond's excellent contrivance for destroying the colours in the object-glasses of telescopes, &c. see Aberration.

With regard to the several fluxes above enumerated, we may observe, in general, that the more calx of lead, or other metallic earth, enters into the composition of any glafs, so much the more fusible, soft, coloured, and dense this glafs is; and reciprocally.

The colours given to glafs by calces of lead are shades of yellow; on the other hand, glafs that contain only falcine fluxes partake of the properties of falt-s; they are less heavy, less dense, harder, winter, more brilliant, and more brittle than the former; and glafs, containing both falcine and metallic fluxes, do also partake of the properties of both these subfubstances. Glafs too falcine are easily susceptible of alteration by the action of air and water; especially those in which alkalis prevail; and these are also liable to be injured by
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by acids. Those that contain too much borax and arsenic, though at first they appear very beautiful, quickly tarnish, and become opaque when exposed to air. By attending to these properties of different fluxes, phosphoric or saline, the artizan may know how to adjust the proportions of these to fand, or powdered flints, for the various kinds of glafs.

Glass, proportion of ingredients in. Different kinds of glafs require different proportions; nor have these been precisely ascertained. We shall here give a table showing the average of several of the most usual and approved mixtures that have been proposed. When asphalt is melted with twice its weight, or more, of dry carbonated alkali, either potash or soda, the result is a very soft deliquecent vitreous mass, always more or less opaque, strongly alkaline to the taste, and which, on exposure to moist air, or more speedily in water, totally dissolves into a clear liquor, which is a solution of fexe in alkali. When the feme alkali is equal to the fexe in weight, or does not much exceed it, the glafs is now transparent, but it is still insoluble in water. It is not till the alkali is diminished to about one-half of the weight of the fexe, that the glafs becomes perfectly hard and insoluble in any corrosive liquor, (the fucic acid excepted,) and, in short, acquires the character of a perfect glafs. This proportion, therefore, of two parts of fand to one of alkali, is usually the datum on which the doses of glæs actually used are regulated. Thus, if common wood ashes (of which the alkali part is reckoned at no more than 10 per cent.) are employed, 10 lbs. of these would require no more than about 20 lbs. of fand. If the better Spanish slags, containing from 45 to 50 per cent. of carbonate of soda, be used, an equal weight of fand may be added; but if purified pearl-ash be taken, it will melt down perfectly twice its own weight of fand. But glæs composed merely of pure alkali and fand, require a very strong fire for their fusion, and are hard, harsh, and difficult to break: they are therefore never used alone. As one half the weight of the fand is reckoned an abundant allowance of alkali, it follows of course that when licharge, arsenic, borax, or any other fluxes are employed, the quantity of alkali will be proportionally diminished. The following proportions are extracted from Macquer's Chemical Dictionary.

If a glafs be required that is dense, fusible, and not faine, one part and a half of red lead or litharge may be mixed with one part of fand, and fued together: if equal parts of fand and of calc of lead be employed, a glafs somewhat less dense and harder will be produced: if a glafs be required of very little density, only faine fluxes must be employed. A glafs of this kind may be composed of fix parts of falt of tartar, or of potash, or of purified soda, mixed with eight parts of fand or of fllts; or of four parts of any of the above-mentioned alkali, mixed with two parts of nitre or of borax, and eight parts of vitrifiable earth. When a crysfal glafs is required, which shall be of an intermediate quality between the metallic and faine glæs, it may be made from a mixture of one part of the above-mentioned falt, one part of calc of lead, and two parts of fand or other vitrifiable earth. By varying the proportion of these ingredients, many different kinds of glæs may be produced, each of which may be good, if the quantity of each of the fluxes employed be proportionable to its vitrifying power.

Glass, instruments for manufacturing. These are fullest for two different purposes; viz., the levigation and mix-ture of the ingredients, and the fusion or vitrification of them. To the former class belong horfe or hard-mills, mortars and peffels, flat fones and mufflers, and fstores or fives. The other sort of utenfils are furnaces, with the proper iron work, pots for containing the composition when put into the fire, and iron instruments for shifting the matter out of one into the other, in case of accidents; and for taking out small portions, in order to judge of the progress of the vitrification, and the quality of the glæs, &c. See the following articles. See also GLASS-blowing, Furnace, and GLASS-pots.

Glass, fusion of. When the ingredients are selected and duly proportioned, they are first calcined for a longer or shorter time, before they are put into the glæs-pots. This operation is called "fritting," and is performed either in small furnaces adjoining to the proper glæs-furnace, and heated by the same fuel after its chief force has been spent upon the glæs-pots, or else in small furnaces or ovens constructed for this purpose. The uses of fritting are, to expel all moisture from the ingredients, by which the glæs-pots would be endangered; to discharge part of the carbonic acid from the alkali and chalk, and thus to moderate the dwellings in the glæs-pots, and especially to cause an adhe-sion, or commencement of chemical union, between the alkali and fexe, and metallic oxys. This operation should be performed gradually, and carried to the point of semi-vitrification, in which the materials strongly adhere, and begin to become pasty, but are still opaque and not homogeneous. This operation serves also to destroy any carbo-naceous matter. When the ingredients are sufficiently fritted, they are thrown with clean iron flouvs through the fide-opening of the furnaces into the glæs-pots, the fire having been previously raised to its greatest intensity, to prevent the furnace from being chilled and to save time. The pots are charged by two or three successive portions, the preceding one being thoroughly melted down before another portion is thrown in. When filled, the fide-opening is closed up with wet clay, excepting a small hole for ex-amining the work, which closet is pulled down when the glæs is well refined and about to be worked off. As soon as the frit begins to feel the action of the fire in the glæs-pots, which is immediately raised to its greatest pitch, it sinks down into a soft palty flate, increasing in ten-a-city till the fusion is complete. However, it is still opaque, from the rising of a white porous fæcum, known by the name of "fandiver," or "glæs-gall." This fub-fance appears to be a confudied mas, confiding of all those falt contained in common alkali, which readily melt at somewhat less than a glæs-melting heat, and are either naturally soluble in a considerable degree, or have little, if any, affinity for fexe, and not mixing with the composition of glæs, but being lighter, rise to the top. Another hetero-geneous fub-fance, called "fandiver," is sometimes found at the bottom of the pots. This is quite different from the other, and seems to confid of a vitrified mas of arsenic and other impurities. But the fæcum, or proper "glæs-gall," is almost entirely faine. When laded out and cooled, it forms a crumbly mas, sometimes white, at other times brown and foured, and strongly faine, but not uniform in its composition, being sometimes merely falt, often very but-ter, probably as common falt or sulphat of potash predominates. It is so volatile in a strong fire, that it is constantly difpersing from the surface of the glæs in a dense vapour, which is first thick and black, afterwards whiter, and which corrodes the top of the crucible in its passage. With long continued fusion it would entirely escape in this flate, if it were not fommed off with long kales, and fold to metal refiners as a powerful flux. Abundance of this glæs-gall is attended with one of the greatest inconveniences to the maker of glæs, as it requires a considerable conurnance of ftrong
from heat to dissipate the whole of it, or otherwise the glass would be full of bubbles, unformed, and having a cloudy gelatinous appearance. It is observed, that glass from potash is more likely to suffer from glass-gall than the soda-glass is, because the potash glasses are harder, and do not run so thin as the other, and the glass-gall from them does not so easily dissipate in the fire.

During this process samples for examination are drawn out of the pots with an iron rod; and the glass gradually becomes more and more flexible, dense, and hissitical, and at last the glass-gall is entirely dissipated. While cracks or bubbles are continued, the glass which was full of seeds and bubbles is refined, and becomes smooth, clear, transparent, and colourless; and this process, which goes on from the cessation of the vapour of the glass-gall and its entire removal to the time when the glass is altogether clear and free from bubbles, is called the "refining." After this the glass is quite complete; but being too thin for working, it is cooled, by flowing the draught of fire round the pot which contains it, and in cooling it thickens to a flat plate for being wrought.

For glasses that is cast into plates, this cooling is necessary, as it is required to flow very thin and hot. On an average it takes about 48 hours for the fine flint glasses, from the time when the pots are first filled till the glass is ready for working, in which state it is of a very full red colour, and possesses a sanguinary kind of confidence and tenacity. It is just foit enough to yield with ease to any external impulsion, even to the force of the breath urged pretty strongly in the centre of the glowing mafs, and may be bent and shaped in every possible way; and fuch is its tenacity, that it extends uniformly without any cracks or failures; but when stretched out to the utmost, it forms a solid string, the diameter of which is constantly decreasing till it separates from the mafs in a thin capillary thread. It flows as it cools, and becomes perfectly brittle and also transparent. As melted glass adheres very readily to polished metal, it is very easily wrought with bright iron tools.

Glass, working or blowing round.—Every kind of glasses, plate-glasses excepted, is formed from a hollow globe that has been produced by blowing. For this purpose the operator takes his blowing-iron, which is a hollow tube, about four or five feet long, and dipping it in the melting-pot, turns it about there till the metal adheres to the iron like some glutinous or clammy juice; he then holds it near the ground, so that the mafs is extended by its own weight, and blows strongly into the tube. With his breath thus penetrating into the centre of the red-hot mafs, he enlarges it into an uniform hollow globe of the requisite thickness and bulk, keeping the force of his breath upon it for a few seconds till it thins by cooling, and thus preventing its thickening by the compression of the denser external air. This globe, adhering by a neck to the iron rod, is formed by the dexterity of the workman, and by a variety of ingenious manoeuvres into all the common vessels. As a specimen of his art, we may mention a common tumbler. The hollow globe already mentioned is taken off the iron rod by the following simple process: An assistant dips the end of a short solid iron rod into the glasses-pot, and, bringing out at its extremity some of the melted glasses, thrusts it immediately against the hollow of the globe at the part directly opposite to the neck, to which it firmly unites, and thus the globe is cemented by the melted glasses to the second rod. The workman then wets a small piece of iron with his mouth, and lays it on the neck of the globe, which is extremely hot, and this, in a second or two, cracks it round; so that with a flint pull it comes off and detaches the hollow rod, leaving the globe open at the neck, and transferred to the second rod at the opposite side. The open globe is again softened by holding it a few seconds over the mouth of the glasses-pot, and is cut away from the open end to the form of a cup by iron shears. The operator, when employed in fashioning the globe, usually sits upon a kind of arm-chair, with its arms sloping forwards and covered with a flat smooth iron-plate; and by laying the iron rod straight before him, reaping from both his sleeves, and turning it backwards and forwards, the hot glasses at the cold end grade like clay, and the mafs is formed, and thus is opened, widened, or compressed at pleasure by any simple iron instrument that is pressed against it. The globular cup is thus extended easily into a cylinder, or made into the shape of a barrel, if this form be required, and is smoothed up at the edges. In order to separate it from the iron-rod, it is wetted as before at the point of attachment, and the tumbler drops off complete. This last operation leaves that burn or roughness, with sharp fragments, which is seen at the bottom of all glasses-tumblers, unless it be taken off by polishing. The next operation is that of cooling the vessel very gradually, called "annealing."

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Glass, different kinds of. The manufactured glasses now in use may be divided into three general kinds; white transparent glasses, coloured glasses, and common green or bottle-glasses: Of the first kind, there is a great variety; as the flint glasses, as it is called with us, and the German crystal glasses, which are applied to the same uses; the glasses for plates for mirrors or looking-glasses; the glasses for windows and other high uses, and the glasses for phials and small vessels.

And these again differ in the substances employed as fluxes in forming them, as well as in the consistencies or finishes of such as are used for their body. The flint and crystal, mirror, and bell window glasses, not only require such purity in their fluxes, as may render it practicable to free the glasses perfectly from all colour: but for the same reason likewise, either the white iron sand, calcined flints, or white pebbles, should be used. The others do not demand the same nicety in the choice of the materials; though the second kind of window glasses, and the bell kind of phials, will not be so clear as they ought, if either too brown sand, or impure fluxes, be suffered to enter into their composition.

Of coloured glasses there is a great variety of sorts, differing in their colour, or other properties, according to the occasions for which they are wanted. The differences in the latter kind depend on the accidental preparation and management of the artificers by whom they are manufactured.

Glass, Crystal. Forgers use this term for our flint glasses, and for making them give the following directions: Take of the whitest tares, pound'd small, and heated as fine as flour, two hundred pounds; of the salt of polverine, a hundred and thirty pounds; mix them together, and put them into the furnace, called the calcar, firr heatting for it. For an hour keep a moderate fire, and keep stirring the materials with a proper rake, that they may incorporate and calcine together; then increase the fire for five hours; after which take out the matter; which, being now sufficiently calcined, is called frit. From the calcar put the frit in a dry place, and cover it up from the dust for three or four months.

Now, to make the glasses, or crystall: Take of this crystall frit, called also bellato; let it in pots in the furnace, adding to it a due quantity of manganese; when the two are fused, call the flour into fair water, to clear it of the salt, called funker; which would otherwise make the crystal obscurc and cloudy. This lottion must be repeated again and again, as often as needful, till the crystal be fully purged; or, this fume may be taken off by means of proper ladles. Then let
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It to boil four, five, or six days; which done, see whether it have manganese enough; and if it be yet greenish, add more manganese, at discretion, by little and little at a time; taking care not to overdo it, because the manganese mingles it to a blackish hue. Then let the metal clarify, till it becomes of a clear and shining colour; which done, it is fit to be blown, or formed into vials at pleasure.

Glass, Flint, as it is called in our country, is of the same general kind with that in other places is called crystal glass. It has this name from being originally made with calcined flints, before the use of the white wood was understood; and retains the name though no flints and now used in the composition of it. This flint glass differs from the other, in having lead for its flux, and white sand for its body; whereas the flints used for the crystal glass are fillets or arcines, and the body consists of calcined flints, or white river pebbles, taris, or such stones. This glass, on account of the quantity of liquor, which enters into its composition, is the heaviest, the most brilliant, the finest, and most easily to work, and also the most expensive. It is that fine glass of which the common and most valuable articles of white glass in domestic or ornamental use are manufactured; and besides, many optical instruments are made of this substance. To the white sand and lead a proper proportion of nitre is added, for the purposes specified in a former part of this general article, and also a small quantity of manganese, and in some works they use a proportionable quantity of arfentic acid to aid the fluxing ingredients. The most perfect kind of flint glass may be made by fusing with a very strong fire a hundred and twenty pounds of the white sand, fifty pounds of red lead, forty pounds of the bell pearl-ashes, twenty pounds of manganese, and five ounces of arfentic acid.

From others we have the following composition for glass of this kind, said to be of the best quality, viz. 120 parts of fine clear white sand, 40 of pearl-ashes well purified, 35 of litharge or minium, 13 of nitre, and a small quantity of black oxys of manganese.

The following composition for a fine crystal glass is given by Loyce: 100 pounds of white sand, 80 to 85 of red oxys of lead, 55 to 40 of pearl-ashes, 2 to 3 of nitre, and one ounce of manganese. The specific gravity of this glass, and of the common London flint-glass, is about 3.2.

Another composition of flint glass, which is said to come nearer to the kind now made, is the following: a hundred and twenty pounds of sand, fifty-four pounds of the bell pearl-ashes, thirty-six pounds of red lead, twelve pounds of nitre, and six ounces of manganese. To either of these a pound or two of arfentic may be added, to increase the flux of the composition. A cheaper composition of flint glass may be made with a hundred and twenty pounds of white sand, thirty-five pounds of the bell pearl-ashes, forty pounds of red lead, thirteen pounds of nitre, six pounds of arfentic, and four ounces of manganese; or, instead of the arfentic, may be substituted fifteen pounds of common salt; but this will be more brittle than the other. The cheapest composition for the worst kind of flint-glass, consists of a hundred and twenty pounds of white sand, thirty pounds of red lead, twenty pounds of the bell pearl-ashes, ten pounds of nitre, fifteen pounds of common salt, and six pounds of arfentic. The bell German crystal glass is made of a hundred and twenty pounds of calcined flints, or white sand, seventy pounds of the bell pearl-ashes, ten pounds of salt-pearl, half a pound of arfentic, and five ounces of manganese. And a cheaper composition is formed of a hundred and twenty pounds of calcined flints, or white sand, forty-five pounds of pearl-ashes, seven pounds of nitre, five pounds of arfentic, and five ounces of manganese.

A glass, much harder than any prepared in the common way, may be made by means of borax in the following method: take four ounces of borax, and an ounce of lime sand; reduce both to a subtile powder, and melt them together in a large close crucible set in a wind-furnace, keeping up a strong fire for half an hour; then take out the crucible, and when cold break it, and there will be found at the bottom a pure hard glass, capable of cutting common glass like a diamond. This experiment, duly varied, may lead to several useful improvements in the arts of glasses, chasms, and factories, and shews an expeditious method of making glass, without any fixed alkali, which has been generally thought an essential ingredient in glasses; and it is not known whether calcined crystal, or other substances, being added to this salt instead of sand, it might not make a glass approaching to the nature of a diamond. Shaw's Lectures, p. 426.

Glass, Crown, is the best sort of window-glasses, and differs from the flint-glass in containing no lead, nor any metallic oxys, except manganese, and sometimes oxys of cobalt, in minute doses, not as a flux, but for correcting the natural colour. This glass is much harder and tougher to the touch than the flint-glass; but when well made it is a very beautiful article. It is compounded of sand, alkali, either potash or soda, the vegetable ashes that contain the alkali, and generally a small portion of lime. A small dose of arfentic is often added to facilitate the fusion. Zaffre, or the oxys of cobalt, with ground flint, is often used to diffuse the dingy yellow of the inferior sort of crown-glass, and by placing the blue natural to glass coloured with this oxys, to convert the whole into a soft light green. One ounce of zaffre is sufficient for 1000 lbs. But when the sand, alkali, and lime are very fine, and no other ingredients are used, no zaffre nor correetive of bad colour is required. A very fine glass of this kind may be made by 200 parts of very good soda, 300 of fine sand, 33 of lime, and from 250 to 300 of the ground fragments of glass. We had formerly in London two kinds of crown glasses, distinguished by the places where they were wrought; viz. 1. Ratcliff crown glasses, which is the bell and cleanest, and was first made at the Bear-garden, on the Bank-side Southwark, but since at Ratcliff: of this there are twenty-four tables to the case, the tables being of a circular form, about three feet six inches in diameter.

2. Landell crown glasses, which is of a darker colour than the former, and more inclining to green. The following composition has been recommended for the bell window or crown glasses, viz. white sand, sixty pounds; of purified pear-ashes, thirty pounds; of salt-pearl, fifteen pounds; of hornes, one pound; and of arfentic, half a pound. If the glass would prove yellow, manganese must be added. A cheaper composition for window glasses consists of sixty pounds of white sand, twenty-five pounds of unpurified pearl-ashes, ten pounds of common salt, five pounds of nitre, two pounds of arfentic, and one ounce and a half of manganese. The common, or green window glasses, is composed of sixty pounds of white sand, thirty pounds of unpurified pearl-ashes, ten pounds of common salt, two pounds of arfentic, and two ounces of manganese. But a cheaper composition for this purpose, consists of a hundred and twenty pounds of the cheapest white sand, thirty pounds of unpurified pearl-ashes, sixty pounds of wood-ashes well burnt and sifted, twenty pounds of common salt, and five pounds of arfentic.

The manufacture of the common window glasses, though made by blowing, is conducted differently from that of the flint glasses articles; as it is the object to produce a large, flat, very thin plate of glass, which is afterwards cut by the glazier's
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Glass, diamond into the requisite shape. Without minutely detailing the several gradations of the process, it may be here mentioned, that the workman takes a very large mass of melted glass on his hollow iron rod, and by rolling it on an iron plate and swinging it backwards and forwards, causes it to lengthen, by its own weight, into a cylinder, which is made hollow and brought to the required thimnes, by blowing with a fan of breath, which perfoins accustomed to the business know how to command. The hollow cylinder is then opened by holding it to the fire, which, by expanding the air confined within it, (the hole of the iron rod being flopped,) bursts it at the weakest part, and while still soft, it is rolled up through its whole length by iron lears, opened out into a flat plate, and finished by annealing as usual.

The large crown glass of Mifri. Hammond and Smith is superior in quality as well in use to that of any other manufacture. The natural diameter of the table in the other manufactures may be taken at 47 or 48 inches, with an occasional variation in a table of one or two inches; and the largest square which can be cut from these measure about 23 inches by 20, and in some circumstances one inch wider or longer. Whereas the glass of Mifri. Hammond and Smith is 63 inches in diameter, and will admit of being cut into squares of about 33 inches by 23 inches, and a little more or less. This glass is almost free from those specks, wreaths, &c. which disfigure other glasses, and disturb the objects seen through it. It now supplies the place of German sheet glass for prints, large fishes, and exportation to those foreign markets where that glass was formerly in use.

Glass, French, as also called Normandy glass, and formerly Lorraine glass, because it was made in those provinces, though it has since been made wholly in the Nine glasses works; five of which were in the forest of Lyons, four in the country of Eu; the last at Beaumont, near Rouen. It is of a thinner kind than our crown glass; and, when laid on a piece of white paper, appears of a dirty-green colour. There are but twenty-five tables of this at the cafe.

Glass, German, is of two kinds, the white and the green: the first is of a whitish colour, but is subject to those small curved streaks, observed in our Newcastle glasses, though free from the spots and blinmifies thereof. The green, besides its colour, is liable to the same streaks as the white; but both of them are straighter, and less warped, than our Newcastle glasses.

Glass, Dutch, is not much unlike our Newcastle glasses, either in colour or price. It is frequently much warped, like that, and the tables are but small.

Glass, Newcastle, is that most used in England. It is of an ash-colour, and much subject to specks, streaks, and other blemishes; and, besides, is frequently warped. Ley-bourn fays, there are forty-five tables to the cafe, each containing five vertical feet: some fay there are but thirty-five tables, and fix feet in each table.

Glass, Phil., is a kind of glasses between the flint glasses and the common bottle, or green glasses. The best kind may be prepared with a hundred and twenty pounds of white sand, fifty pounds of unpurified pearl-ashes, ten pounds of common salt, five pounds of arsenic, and five ounces of manganese. The composition for green or common phial glasses, contains of a hundred and twenty pounds of the cheapest white sand, twenty pounds of wood ashes, well burnt and fitted, twenty pounds of pearl-ashes, fifteen pounds of common salt, and one pound of arsenic.

Glass, common green bottle, is made almost entirely of sand, lime, and sometimes clay, alkaline ashes of any kind, as cheapness or convenience direct, and more especially of help in this country, of barilla, varee, and the other varieties of soda in France, and of wood ashes in many parts of Germany, and the like. To these ingredients is sometimes added the earth remaining from faifie ashes, after the alkali and falta have been extracted by lixiviation, and in England flags from the iron furnaces. Bottle-glasses is a very hard well-vitrified glasses, which resists the corrosive action of all liquids much better than flint glasses. It is used, not only for wine-bottles, but for very large retorts, subliming vellsels, and other articles of the chemical apparatus; and it has for this purpose the advantage of bearing as much as a pretty full red heat without melting or sinking down into a shapeless lump, as the lead-glass is wound do. The following composition is given by Leyfyl as a good and cheap material for bottle-glasses; viz., 100 parts of common sand; 32 of varee (a kind of coarse help made on the western coasts of France), 160 of the lixiviated earth of ashes, 30 of fresh wood-ash, or any other kind of ash, 80 of brick-clay, and any quantity, generally about 100, of broken glasses. This composition yields no glasses-glass. This kind of glasses is formed of sand of any kind, fluxed by the ashes of burnt wood, or of any parts of vegetables; to which may be added the fclirna or clinkers of forges. When the softest fand is used, two hundred pounds of wood-ashes will suffice for a hundred pounds of fand, which are to be ground and mixed together. The composition with the clinkers consists of a hundred and seventy pounds of wood-ashes, a hundred pounds of sand, and fifty pounds of clinkers, or fclirna, which are to be ground and mixed together. If the clinkers cannot be obtained, they must be broken into small pieces, and mixed with the other matter without any grinding.

A good bottle-glass, but nearly black and opaque, has been made in France, glassed over with a black earth found in the valleys of all basaltic countries. In France it abounds in the Vivara, in Languedoc, and Arvern. The first glasses of this kind appears to have been made in 1780 by a M. Duclos at the suggestion of Chaptal, who simply melted some of this basalt without addition in a glass-fruit, and formed of it two very light, black, or rather deep yellow, finishing, perfect bottles. In subsequent trials by another artist, a mixture of equal parts of basalt and sand was employed, as preferable to the basalt alone; but notwithstanding a considerable demand for bottles of this material, the manufacture was abandoned owing to want of uniformity in the ingredients, which made them often fail. The colour of this glass was of a green-olive.

The green colour, transmitted by bottle-glasses, when in its perfect state, is owing to the iron contained both in the vegetable ashes and in the sea-sand, which enter into its composition. This glass affords an influence of a semi-liquid substance, which exhibits a blue colour by incident light, and a yellow or orange colour by that which is transmitted. Soireau laid on the cause of the permanent colour of opaque bodies.

Glass, Plate, is the most perfect and beautiful glasses, of which all the kinds of mirrors and looking-glasses are composed. The materials of which this kind of glasses is made are much the same as those of other works of glasses, viz., an alkali salt, and sand.

To prepare the salt, they clean it well of all foreign matters; pound or grind it with a kind of mill, and finally sift it pretty fine.

Pearl-ashes, properly purified, will furnish the alkali salt requisite for this purpose; but it will be necessary to add borax, or common salt, in order to facilitate the fusion, and prevent the glasses from stiffening in that degree of heat, in which
which it is to be wrought into plates. For purifying the
pearl-sables, dissolve them in four times their weight of boil-
ing water, in a pot of cold iron, always kept clean from
rust. Let the solution be removed into a clean tub, and
remain there twenty-four hours, or longer. Having decanted
the clear part of the fluid from the dregs or sediment, put
it again in the iron pot, and evaporate the water till the fats
are left perfectly dry. Preserve them in stone jars, well fo-
cured from air and moisture.

Pearl-sables may also be purified in the highest degree, so
as to be proper for the manufacture of the most transpar-
ent glass, by pulverizing three pounds of the best pearl-
sables, with six ounces of salt-petre, in a glass or marble
mortar, till they are well mixed; and then putting part
of the mixture into a large crucible, and expelling it in a
furnace to a strong heat. When this is red-hot, throw in the
rest gradually, and when the whole is red-hot, pour
it out on a moistened stone or marble, and put it into an
earthen or clean iron pot, with ten pints of water; heat it
till over the fire till the fats be entirely melted; let it then
cool, and filter it through paper into a power vessel.
When it is filtered, put the fluid again into the pot,
and evaporate the salt to dryness, which will then be as
white as snow; the nitre having burnt all the phlogistic
matter that remained in the pearl-sables, after their former
calcination.

As to the sand, it is to be sifted and washed, till such
time as the water come off very clear; and when it is well
dried again, they mix it with the salt, passing the mixture
through another sieve. This done, they lay them in the
annealing furnace for about two hours; in which time the
matter becomes very light and white, in the ashes, which
are called frit, or fritsa; and are to be laid up in any clean
place, to give them time to incorporate. They lie here for
at least a year.

When they would employ this frit, they lay it for some
hours in the furnace, adding to form the fragments or
shards of old and ill-made glasses; taking care first to cal-
cine the shards by heating them red-hot in the furnace, and
then cooling them into cold water. To the mixture must
likewise be added manganese, to promote the fusion and
purification.

The best composition for looking-glass plates is said to
consist of sixty pounds of white sand cleansed, twenty-five
pounds of pure pearl-sables, fifteen pounds of salt-petre,
and seven pounds of borax. If a yellow tinge should affect
the glass, a small proportion of manganese, mixed with an
equal quantity of arsenic, should be added. An ounce of
the manganese may be first tried; and if this proves insuffi-
cient, the quantity should be increased.

A cheaper composition for looking-glass plates consists of
sixty pounds of the white sand, twenty pounds of pearl-sables,
ten pounds of common salt, seven pounds of nitre, two
pounds of arsenic, and one pound of borax.

The materials of the finest plate glass, such as that of
French manufacture, are white sand, soda, and lime, to
which are added manganese and zaffre, or any other oxide
of cobalt for particular colouring purposes. The sand is
of the finest and whitest kind, which should be previously
pulverized; the soda and lime, melted very hot, are put into water,
in which it should be well thinned and washed. The shrapt
grained sand is preferred, and it is found that grains of
moderate size melt with the alkali sooner, than the very
fine dust or the larger fragments. The alkali is always
fossa, which is preferable to potassa, as glasses made with
fossa are found to be softer and to flow thinner when hot,
and yet to be equally durable when cold. Besides, the
neutral fats with the base of soda which constitute the glass-
gall in this inclusion, such as the muriat and fulphat of
fossa, appear to be dissipated more readily by the fire than
the corresponding fats of potassa. The fossa that is used is
considerably pure, or such as is separated from the rough
ashes of bardilla, and other fossa plants by lixiviation. Lime
adds to the fusibility of the other materials, supplying
the use of litharge in the finest glasses; but excess of it would
impart the colour and solidity of the glass. About 1:15th of
the whole is so much as can properly be used; but some
reduce the quantity to 1:24th. The decolouring substances
are azure, or cobalt blue, and manganese. Besides these,
there is always a great quantity of the fragments of glass,
collected from the walls of the manufactories, which are
made fusible by quenching in water when hot, and used in
this plate together with the fresh materials. As to the quanti-
ties and proportions of the ingredients, much latitude
is allowed. The following are said to produce a very fine
glass: 30 lbs. of sand; 260 lbs. of soda; 56 lbs. of lime; 32 ounces of manganese, three times, and of azurite
and 34 lbs. of fragments of glass. In the manufacture of St.
Gobin's glass is observed with regard to the materials; but
it is affirmed, and with much probability, that borax is used
in small quantity.

Of the materials now enumerated the sand, soda, lime,
and manganese are first mixed together with more care than
for ordinary glasses, and they are fired in small furnaces built
for this purpose, the heat being gradually raised to a full red-
white, and then kept with frequent stirring till the materials
undergo no further change, nor yield any kind of vapour.
The azure and glass fragments being already in a state of
perfect vitrification are not added till just at the end of the
process, which lasts about six hours. When the materials
are thus prepared, they are fire for plate-glasses, to be formed
either by blowing or casting. The largest glasses at St.
Gobin are run; the middle-sized and small ones are blown.

Blowing looking-glase plates. The work-houses, furnaces,
&c., used in the making of this kind of plate-glasses, are
the same, except that there are flues, and that the car-
quaries are disposed in a large covered gallery, over which
the furnace, as those in the following article, to which the
reader is referred.

After the materials are vitrified by the heat of the fire,
and the glass is sufficiently refined, the workman dips in his
blowing iron, six feet long, and two inches in diameter,
sharpened at the end, which is put in the mouth, and widened
at the other, that the matter may adhere to it. By this
means he takes up a small ball of matter, which sticks to
the end of the tube by conflux turning it. He then
blews into the tube, that the air may swell the annexed
ball; and carrying it over a bucket of water, which is
placed on a support at the height of about four feet, he
sparks the end of the tube to which the matter adheres,
with water, still turning it, that by this cooling, the mat-
ter may cohere with the tube, and be fit for furnishing a
greater weight. He dips the tube again into the flame pot,
and proceeds as before; and, dipping it in the pot a third
time, he takes it out, loaded with matter, in the shape of a
pear, about ten inches in diameter, and about a foot long, and
cools it at the bucket; at the same time blowing into the
tube, and, with the assistance of a labourer, giving it a
balancing motion, he causes the matter to lengthen; which,
by repeating this operation several times, assumes the form
of a cylinder, terminating like a ball at the bottom, and in
a point at the top. The assistent is then placed on a stool
three feet and a half high; and on this stool there are two
Tu

upright
upright pieces of timber, with a crofs beam of the fame, for supporting the glafs and tube, which are kept in an oblique position by the affistant, that the matter workman may with a puncheon feet in a wooden handle, and with a ma
dlet make a hole in the mafs; this hole is drilled at the
centre of the ball that terminates the cylinfer, and is
about an inch in diameter. When the glafs is pierced,
the defects of it are perceived; if it is tolerably perfect,
the workman lays the tube horizontally on a little iron
trefTel, placed on the support of the aperture of the furnace.
Having exposed it to the heat for about half a quarter of an
hour, he takes it away, and with a pair of long and broad
fears, extremely sharp at the end, widens the glafs, by infi-
nuating the fears into the hole made with the puncheon,
whirl the affistant, mounted on the floor, turns it round, till,
at last, the opening is fo large as to make a perfect cylinder
at bottom. When this is done, the workman lays his glafs
upon the trefTel, at the mouth of the furnace, to heat it: he
then gives it to his affistant on the floor, and with large
fears, cuts the mafs of matter up to half its height. This
is at the mouth of the furnace an iron tool, called pontil,
which is now heating, that it may unite and coalesce with
the glafs just cut, and perform the office which the tube did
before it was separated from the glafs. This pontil is a piece
of iron, fix feet long, and in the form of a cane or tube,
having at the end of it a small iron bar, a foot long, laid
equally upon the long one, and making with it a T. This
little bar is full of the matter of the glafs, about four inches
thick. This red-hot pontil is prefented to the diameter of
the glafs, which coalesce immediately with the matter round
the pontil, fo as to support the glafs for the following ope-
ration. When this is done, they separate the tube from the
glafs, by striking a few blows with a chaffee upon the end
of the tube, which has been cooled; fo that the glafs breaks
directly, and makes this separation, the tube being discharged
of the glafs now adhering to the pontil. They next present
to the furnace the pontil of the glafs, laying it on the trefTel
to heat, and redden the end of that glafs, that the workman
may open it with his fears, as he has already opened one
end of it, to complete the cylinfer; the affistant holding it
over his head as before. For the half time they put the pontil
on the trefTel, that the glafs may become red-hot, and the
workman cuts it quite open with his fears, right over-
against the fore-mentioned cut: this he does as before,
taking care that both cuts are in the fame line. In the
mean time, the man who looks after the carquaisie, comes
to receive the glafs upon an iron shovel, two feet and a half
long without the handle, and two feet wide, with a small
border of an inch and a half to the right and left, and
wards the handle of the shovel. Upon this the glafs is
bad, flattening it a little with a small thick a foot and a half
long, fo that the cut of the glafs is turned upwards. They
separate the glafs from the pontil, by striking a few gentle
blows between the two with a chaffee. The glafs is then re-
moved to the mouth of the hot carquaisie, where it becomes
red-hot gradually; the workman, with an iron tool, fix feet
long, and widened: the end in form of a club at cards,
four inches long, and two inches wide on each side, very flat,
and not half an inch thick, gradually lifts up the cut part of
the glafs, to unfold it out of its form of a flattened cylin-
der, and render it smooth, by turning it down upon the
hearth of the carquaisie. The tool, already described, being
valuated within the cylinder, performs this operation, by
being pulled hard against all the parts of the glafs. When
the glafs is thus made quite smooth, it is pulled to the
bottom of the carquaisie, or annealing furnace, with a small
iron raker, and ranged there with a little iron hook. When
the carquaisie is full, it is flapped and cemented as in the
cafe of run glafs, and the glafs remains there for a fort-
night to be annealed; after which time, they are taken out
to be polished. A workman can make but one glafs in an
hour, and he works and rolls for fix hours alternately.

It may be observed, that looking-glafs, thus blown,
should never be above forty-five, or at most fifty inches long,
and of a breadth proportionable. Thofe exceeding these
dimensions, as we frequently find among the Venice glafs,
cannot have the thickness sufficient to bear the grinding;
and, besides, are subject to warp, which prevents them from
regularly reflecting objects. Whereas plates as large as
nine feet in length and proportionally wide, have been man-
ufactured by casting.

A casting in running large Looking-glafs plates. This art, as
we have obferved in the History of Glass, is of French
invention. It is owing to the Sieur Abraham Vlehart, who
first propofed it to the court of France, in 1688.

It is performed much like the casting of lead among
the plumbers; and by means hereof we are not only enabled
to make glafs of more than double the dimensions of any
made by the Venetian way of blowing; but also to cast all
kinds of borders, mouldings, &c.

The furnaces for melting the materials of this manufacture
are of large size, being about 18 feet long and 15 wide; and
thofe for annealing the glafs, when formed, are much more
fo. Round a melting-furnace, there are at least twenty-four
annealing furnaces or ovens; each from twenty to twenty-
five feet long; they are called carquaisies: each carquaisie
has two tiffarts, or apertures, to put in wood, and two
chimneys. Add, that beside the annealing furnaces, &c.,
there are others for making of frit, and calcining old pieces
of glafs.

All these furnaces are covered over with a large shed;
under which are like wife forges, and work-houfes for smiths,
carpenters, &c. continually employed in repairing and keep-
ing up the machines, furnaces, &c. as also lodges, and apart-
ments for thefe, and the other workmen, employed about
the glafs, and keeping up a perpetual fire in the great fur-
nace, fo that the glafs-house, as that in the calle of St.
Cebbin, in the foref of Fero, in the Scaffions, appears more
like a little city, than a manufactory.

The infide of furnaces is formed of a fort of baked earth,
or refractory clay, proper to fulfill the action of fire; and
the fame earth serves also for melting-pots, ciferns, &c.
The furnaces feldom laft above three years; after which
they are to be rebuilt, from bottom to top; and to keep
them good, even for that time, the infide muft be refeted
every fix months, at which time the fire is extinguifhed.
The melting-pots are as big as wine hogheads, about three
feet in height, and in diameter; and contain above two
thousand weight of metal. They are in the form of an in-
verted and truncated cone. The ciferns, or pans, called
"cuveters," are much smaller, being about thirty-six inches
long, eighteen inches wide, and as many deep; and serve
for the conveyance of liquid glafs, which is drawn out of
the pots to the casting tables. They do not contain much more
than a fifth, or when large plates are cast, a third of the
pots.

When the furnace is in condition to receive the pots and
ciferns, they heat it red-hot, which requires fifty cords, or
a hundred cart-loads of wood. That kind of wood which
emits the largest and brighteft flame, without much refinous
smoke, is preferred. This done, they fill the pots with the
materials, or soda and sand, which is done at several times,
to facilitate the fufion. When the matter is sufficiently
vitrified, refined, and settled, which ufually happens in thir-
G I A S S.

thirty-six hours, they fill the cisterns, which are in the same furnace, and which are left there about six hours longer, till such time as they appear all white through the excessive heat.

To get the cisterns with the metal out of the furnace, they make use of a large iron chain which opens and shuts with hooks and eyes. From the middle of this, on each side, arise two massive iron pins, by which, with the assistance of pulleys, the cisterns are raised upon a kind of carriage of proper height; and thus conducted to the table where the glass is to be run. The cistern is then raised above the tables with an engine, in form of a crane, by means of two iron bars, so contrived as to throw the cistern into an inclined position, which discharges a torrent of matter, all on fire, with which the table prepared for this purpose is presently covered.

The table on which the glass is to be run, is of smooth thick copper-plate, about ten feet long, and six feet broad. It is supported on a wooden frame, with truckles, for the convenience of removing from one cistern, or annealing furnace, to another; in proportion as they are filled.

Or, when each pot has a cistern table, it is strongly supported by masonry, and contiguous to each table on the same level are the annealing ovens, upon which, being flat, the glass, when cold and sufficiently cooled, may be filled from off the copper-table without much difficulty. The tops of the flat ovens and the tables are on a level with the corresponding opening of the furnace, whence the cisterns or cisterns are withdrawn. When the glass is melted and fined in the manner already stated under the article Flint Glass, the cistern or cistern, previously made hot in the furnace, is filled out of the pot with a copper ladle, about ten inches in diameter, fixed to an iron handle seven feet long, properly supported on an iron flay by two workmen; and after remaining in the furnace for some hours, till the samples taken out for trial appear to be quite clear and limpid, the door of the furnace is opened, and the cistern is pulled out and removed to the side of the copper table. It is then frozen with an instrumcnt consisting of a copper blade hot in iron, and hoisted for the discharge of its contents on the table, in the manner already mentioned.

To form the thickness of a glass, and to make the surface smooth and even, there are two iron rollers or rims, placed round the edge of the table; and on these rest the two extremes of a kind of roller, or hollow heavy cylinder of copper, turned after being call, and about 500 pounds in weight, which serves to drive the liquid matter before it to the end of the table, or mould. The iron rollers being moveable, and capable of being set closer, or farther apart, at pleasure, determine the width of the glases, and retain the matter, that it does not run off at the edges. The white glases, if any, falls into a vessel of water, and is reserved for the next melting.

As soon as the matter is arrived at the end of the table, and the glases is come to a confidence, examined by the directors of the manufacture, and approved, they move it off into the annealing furnace, with an iron raker, as wide as the table, that has a handle two fathoms long; being assisted by workmen on the other side of the carquais, who, with iron hooks, pull the glases to them, and range it in the carquais, which holds six large glases.

What is most surprising throughout the whole of this operation, is the quickness and address wherewith such sally cisterns, filled with a flaming matter, are taken out of the furnace, conveyed to the table, and poured on it, the glases spread, &c. The whole is inconceivable to such as have not been eye-witnesses of that surprising manufacture.

As fast as the cisterns are emptied, they carry them back to the furnace and take fresh ones, which they empty as before. This they continue to do, so long as there are any full cisterns; laying as many plates in each carquais as it will hold, and stopping them up with doors of baked earth, or clay, and every chink with cement, as soon as they are full, to let them anneal, and cool again, which requires about fourteen days.

The first running being dispatched, they prepare another, by filling the cisterns anew, from the matter in the pots; and after the second, a third, and even a fourth time, till the melting pots are quite empty.

The cisterns at each running should remain at least six hours in the furnace to whiten; and when the first annealing furnace is full, the casting table is to be carried to another. It need not here be observed, that the carquais, or annealing furnaces, must first be heated to the degree proper for them. It may be observed, that the oven full, or the quantity of matter commonly prepared, supplies the running of eighteen glases, which is performed in eighteen hours, being an hour for each glase. The workmen work six hours, and are then relieved by others.

When the pots are emptied, they take them out, as well as the cisterns, to scrape off what glases remain, which otherwise would grow green by continuance of fire, and spoil the glases. They are not filled again in less than thirty-six hours, so that they put the matter into the furnace, and begin to run it every fifty-four hours.

The manner of heating the large furnaces is singular enough; the two tifors, or persons employed for that purpose, in their shirts, run round the furnace without making the least stop, with a speed scarce inferior to that of the lighted courier: as they go along, they take two billets, or pieces of wood, which are cut for the purpose; these they throw into the first tiffair; and continuing their course do the fame for the second. This they hold without interruption for six hours successively; after which they are relieved by others, &c. It is surprising that two such small pieces of wood, and which are consumed in an instant, should keep the furnace to the proper degree of heat; which is such, that a large bar of iron, laid at one of the mouths of the furnace, becomes red-hot in less than half a minute.

It is computed, that a furnace, before it be fit to run glases, cools above three thousand five hundred pounds; that at least six months are required for the building it anew, and three months for the refitting it; and that when a pot of matter burris in the furnace, the loss of matter and time amounts to above two hundred and fifty pounds.

The glases, when taken out of the melting-furnace, needs nothing further but to be ground, polished, and foliated. But before these operations are performed, they cut and square the edges of the plates; which is performed with a rough diamond, passed along the surface of the glases, upon a square ruler, like that of the glaziers, and made to cut into the substance of the glases to a certain depth. This cut is then opened by gently knocking with a small hammer on the under side of the glases, just under it; by which means the piece comes off, and the roughness of the edges are removed by pincers. The plates are then laid by for grinding, polishing.
GLASS.

Polishing, and silvering; which see respectively. See also Looking-Glass.

Glass. Annealing, or Heating of. The operation of annealing of glasses is performed in a peculiar furnace called the lehr, which consists of two parts, the tower and lehr. The vessels as soon as made, are placed by the workmen on the floor of the former to anneal; which done, they are drawn slowly in a sort of a pan, called fractures, by an operator called the farrel-man, all along the latter, the space of five or six yards, to give them time to cool gradually; so that when they reach the mouth of it, they are found quite cold. Merret, Not. to Nari, p. 243, fig.

This annealing is generally performed in a hot chamber, built for the purpose, at the top of the glasses-house, above the crucibles, and a little below the chimney. Without this precaution, the glasses would be liable to fly and break, by the heat change of heat and cold, by the smallest scratch, and sometimes without any apparent external cause. The hard glasses, and those especially that are made with alkali and earths, require much more annealing than the softer and more fusible glasses, containing in their composition much limestone.

The particles of glasses by annealing are supposed to lose part of their springiness, and their brittleness at the same time. A gradual heating or cooling of glasses, according to Dr. Hook, anneals or reduces its parts to a texture more loose, and easy to be broke; but virtual more flexible than before. And hence in some measure the phenomena of glasses-drops.

Some of the phenomena depending on the fragility of unannealed glasses deserve the attention of the curious. Those of the lacrymiae, or glasses-drops, were among the first taken notice of; and it has also been observed, that hollow bells made of unannealed glasses, with a small hole in them, will fly to pieces by the heat of the hand only, if the hole by which the internal air is expelled be closed.

One whole bottom is three fingers breadth in thickness, dies with as much ease as the thinest glasses. Some of these vessels have been used with strokes of a metal sufficient to drive a nail into wood tolerably hard, and have resisted fracture. They also refill the stock of several heavy bodies let fall into their cavities, from the height of two or three feet. For instance, mallet-balls, pieces of iron, or other metal; pyrites, Jasper, wood, bone, &c.; but this is not surprising, as other glasses of the same size do the same. But the wonder is, that taking a flint of the fire of a small pea, and letting it fall into the glasses only from the height of three inches, in about two seconds the glasses flies, and sometimes in the very moment of the stroke; nay a list of flint, no longer than a grain, dropped into several glasses successively, though it did not immediately break the m, yet they all flow, being set by, in less than three quarters of an hour. Phil. Trans. ibid. p. 529.

Some other bodies produce a like effect with flint; for instance, sapphire, porcelain, diamonds, hard tempered steel, as also marbles, such as boys play with; to which add pearls from the animal kingdom.

The experiment succeeded also when the glasses were held in the hand, reflected on a pillow, put in water, or filled with water. It is also remarkable, that the flints broke upon their bottoms being slightly rubbed with the finger, though some of them did not fly till half an hour after the rubbing.

If the glasses be every where extremely thin, they do not break in these circumstances.

Some have pretended to account for these phenomena, by saying, that the bodies dropped into these vessels cause a concussion, that is stronger than the cohesion of the parts of the glasses, and that consequently a rupture of the same must ensue. But why does not a ball of gold, silver, iron, copper, or several other bodies, even a thousand times heavier than a flinter of flint, equally cause this concussion, and break the glasses?

Mr. Euler has endeavoured to account for these appearances from his Principles of Perfection. He thinks this experiment entirely overthrows the opinion of those who measure the force of concussion by the weight; and he thinks the principles he has established give a clear solution of this phenomenon. According to these principles, the extreme hardness of the flint, and also its angular figure, which makes the space of contact with the glass vessel extremely small, ought to cause an impression on the glasses vastly greater than lead or any other metal; and this may account for the flints breaking the vessel, though the bullet, even falling from a considerable height, does no damage. Mem. Acad. Berlin, 1745, p. 47.

Hollow cups, made of the green bottle-glasses, some of them three inches thick at bottom, were instantly broken, by a flint of flint weighing about two grains, though they had refilled the shock of a market bulb from the height of three feet. Phil. Trans. ibid. p. 515.

"The precise mechanical cause of this disposition to crack in unannealed glasses, is very difficult to explain," says Aikin (Dict., "but generally speaking, it is supposed to be the forcible contraction of the outer part by sudden cooling, whilst the inner portion is still soft and half-fluid, so that the whole fixes with a permanent strain or inequality of pressure of one part upon the other; and as glasses is extremely elastic, though brittle, any force which tears a fragment, however small, of the tense part, communicates a strong and sudden impulse over the whole mass." "This most singular phenomenon," (of the Rupert's drop) says the same ingenious chemist, in confedence of his own experiments, "is obviously owing to some permanent and very strong inequality of pressure, for when they are heated to red, as to be soft and merely let to cool of themselves, this property of bursting is entirely lost, and, at the same time, the specific gravity of the drop is increased. The peculiar brittleness of the Bologna phial is also removed by again heating and cooling slowly." The common window-glasses, when badly annealed, is cut by the diamond with difficulty, and the cut often lies in a direction different from what is intended, or the glasses entirely breaks.

Among other more common defects of glasses, we may mention its liability to be acted upon by corrosive liquors, as is the caie when too much saline flux has been used. As impermeable as glasses is to the common menstruums, we find it eaten by the air in length of time, when exposed in old windows; but the effects of its being kept in a subterraneous place are much more strange. Berthollet tells us, that at the
the time when he was at Rome, there was dug up a whole house from under the kitchen garden of a citizen. The house had been buried there ten ages, and there were found in it several glass jars, or lacrymatories. The glass of these had no holes made in it, as our old glass in chamber-windows has, but still retained its smooth surface and transparence; but it was split into a vast number of thin laminae, which were as pellucid and fine as Mufcovy glads; and in some places were tinged with all the beautiful colours that art could have given. We are not acquainted perfectly with the ancient way of working their glads; but it is not probable there could be any thing particular in the formation of the vessel, to determine it to split thus into flakes; but that glads of the fame kind, in any form, would have done the fame. 

Borrich de Ortu Chemie.

There are other visible imperfections in glads, materially injuring its foundness and beauty, and enumerated by Aikin (Dict. art. Glass; under the denominations of frieves, threads, tears, and knots. The former are undulating waves in the glads, arising from the imperfect mixture of the materials, and their different specific gravities. Accordingly, we may observe, that the most transparent glads is subject to bubbles and veins, the methods of preventing which are yet little known; and this is an inconvenience by which Mr. Dollond's excellent discovery is affected; for the flint-glasses which he uses is peculiarly subject to small veins, that disturb the rays in their passage, and render the vision confused. This effect is owing to the density of these veins being greater than that of the rest of the glads, as appears from their image received on white paper, when the glads is held between the paper and a candle, or other luminous object: for this image of a vein, thus received, is a line brighter than the rest of the image of the glads, and this bright line is defined by a dark edge on each side. But the bright line evidently shows a convergence of rays, which can only be effected by the veins being denser than the medium in which they are placed. The reason why flint glads is more subject to veins than other glads is, says the translator of Macquer's Chemical Dictionary, because it is composed of materials of more different densities.

Mr. Macquer, with a view of improving the manufacture of this glads, proposes to facilitate the union of the ealx of lead and sand, of which it is composed, by depriving the ealx of lead, as much as possible, of its phlogiston, which may be done by combining the vitriolic acid with minium, or red-lead, and expounding this composition to the operation of fire, to difengage it from the acid; and also by giving these two sublimations the greatest possible degrees of fluidity and mobility, which may be done by mixing with the composition of them a considerable quantity of solvents. Hist. Acad. Science. for 1773.

Thread in glads, are those finey filaments which arise from the vitrification of the clay; being generally green, and rendering the glads more liable to crack at these parts. But one of the worst defects (says Aikin, ubi supra) is "tears, or drops of vitrified clay falling down from the furnace into the pots, and entangled with the glads. Articles made of glads with this defect, are always very brittle, and generally break themselves by slight changes of heat and cold." Small bubbles appear in glads not sufficiently refined by a continuance of the melting heat; and these may be owing to a deficiency of flux, so that the glads is less fusible, and the bubbles cannot easily be disengaged. "Hence," says the author now cited, "the soft fusible glads which are much lead are much less liable to this fault than the hard, green bottle-gads, which is made only of alkali and earth." The knots in glads arise either from a portion of sand that has escaped vitrification, and remains entangled in the glads, or from a remaining quantity of glads-gall; or from bits of the crucible which may be accidentally knocked off by the iron instruments used in the working.

Glass of Antimony. See Gla.s of Antimony and Vi-trum Antimonii ceram.ation.

Glass, Axungia of. See AXUNGIA, SANDIVER, and Glass, jasper.

Glass of Borax. See BORAX.

Glass, Colouring of; to imitate gems. See Gems.

Glass, Gold-coloured. This kind of glads may be made by taking ten pounds of either of the compositions for hard glads, omitting the salt-petre; and for every pound adding an ounce of calcined borax; or, if this quantity do not render the glads sufficiently fusible, two ounces; ten ounces of red tartar, of the deepest colour, two ounces of mangane, and two drums of charcoal of fallow, or any other soft kind. Precipitate of silver baked on glads will stain it yellow, and likewise give a yellow colour on being mixed with and melted with forty or fifty times their weight of vitreous compositions; the precipitate from aqua-fortis by fixed alkali leaves to answer well. Yellow glads may also be obtained with certain preparations of iron, particularly with Prussian blue. But Dr. Lewis observes, that the colour does not conftantly succeed, nor approach to the high yellow of gold, with silver or with iron. The nearest imitations of gold which he has been able to produce, have been effected with antimony and lead. Equal parts of the glads of antimony, of flint calcined and powdered, and of minium, formed a glads of a high yellow; and with two parts of glads of antimony, two of minium, and three of powdered flint, the colour approached still more to that of gold. The last composition exhibited a multitude of small sparkles interferred through its whole sublimation, which gave it a beautiful appearance in the mafs, but were really imperfections, owing to air-bubbles.

Neri chrcêts, for a gold-yellow colour, one part of red tartar, and the fame quantity of mangane, to be mixed with a hundred parts of flint. But Knuckel observes, that these portions are faulty; that one part, or one and a quarter of mangane, is sufficient for a hundred of flint; but that six parts of tartar are hardly enough, unless the tartar is of a dark red colour, almost blackish; and that he found it expedient to add to the tartar about a fourth of its weight of powdered charcoal. He adds, that the glads swells up very much in melting, and that it must be left unflirred and worked as it stands in fusion. Mr. Samuel More, in repeating and varying this process, in order to render the colour more perfect, found that the mangane is entirely essential to the gold colour, and that the tartar is no other wise of use, than in virtue of the cloudy matter, to which it is in part reduced by the fire; the phlogiston or inflammable part of the coal appearing in several experiments to be the direct tinging sublimation. Mr. Pott also, in his Nene Wichtige Physico-Chimische Materien, &c. printed in 1762, observes, that common coal gives a yellow colour to glads; that different coaly matters differ in their tinging power; that auyt mortum of foot and lump-black answers better than common charcoal; and that the sparkling coal which remains in the retort after the rectification of the thick empyreumatic animal oils, is one of the most active of these preparations. This preparation, he says, powdered, and then burnt again a little in a close vessel, is excellent for tinging glads, and gives yellow, brown, reddish, or blackish colour, according to its quantity; but the frit must not be very hard
hard of fusion; for, in this case, the strong fire will destroy the colouring substance before the glafs melts; and he has found the following compositions to be nearly the best; viz., four parts, alkali three parts; or four two, alkali three; calcined borax one; or four two, alkali two, calcined borax one; and though salt-petre is hardly used at all, or very sparingly, for yellow glases, as it too much volatilizes the colouring substance; yet here for the most part a certain proportion of it, easily determined by trial, is very necessary; for without it, the concentrated colouring matter is apt to make the glafs too dark, and even of an opaque pitchy blackness. It does not certainly appear that there is any material diversity in the effects of different coals; the difference being probably owing to the different quantities of the inflammable matter which they contain; so that a little more shall be required of one kind than of another, for producing the fame degree of colour in the glafs. Nor does the fineness or fulness of the frit appear to be in any respect necessary.

Gold-coloured ftrangles may be diffused through the substance of glafs, by mixing the yellow tals with powdered glafs, and bring them into fusion. See Lewis's Com. Phil. Techn. p. 252. 626, &c.

GLASS for counterfeiting lapis lazuli. See Lapis Lazuli.
GLASS refilling opal. See Opal and Gems.

GLASS. Ruby. The way to give the true fine red of the ruby, with a fair tranpareence, to glafs, is as follows. Calcine in earthen vessels gold diffolved in aqua regia, the mercury being evaporated by distillation, more aqua regia added, and the abfraction repeated five or six times, till it becomes a red powder. This operation will require many days in a hot furnace; when the powder is of a proper colour, take it out; and when it is to be used, melt the finest crystal glafs, and purify it, by often casting it into water; and then add, by small quantities, of enough of this red powder to give it the true colour of a ruby, with an elegant and perfect tranparence. Neri. See Gems.

The procfs of tinging glafs and enamels by preparations of gold, were first attempted about the beginning of the 17th century. Libavius, in one of his tracts, entitled Alchymia, printed in 1626, conjectures that the colour of the ruby proceeds from gold, and that gold diffolved, and brought to rednesses, might be made to counterfeit the colour of other gems and glafs. On this principal Neri, in his "Art of Glafs," dated 1611, gives the procefs above recited. Glauber, in 1648, published a method of producing a red colour by gold, in a matter which is of the vitreous kind, though not perfectly glafs. For this purpose he ground powdered frit or sand with four times its weight of fixed alkaline falt; this mixture melts in a moderately strong fire, and when cold looks like glafs, but exposed to the air runs into a liquid state. On adding this liquor to solution of gold in aqua regia, the gold and fmit precipitate together in form of a yellow powder, which by calcination becomes purple; by mixing this powder with three or four times its weight of the alkaline solution of fmit, drying the mixture, and melting it in a strong fire for an hour, a mass is obtained, of a transparent ruby colour, and of a vitreous appearance, which neverthelefs is soluble in water, or by the moisture of the air, on account of the redundance of the falt. The honourable Mr. Boyle, in a work published in 1685, mentions an experiment, in which a like colour was introduced into glafs without fusion; for, having kept a mixture of gold and mercury in digelation for some months, the fire was at last immediately mercufed, so that the glafs hurft with a violent expanfion; and the lower part of the glafs was found tinged throughout of a transparent red colour, hardly to be equalled by that of rubies. See Porphyry of Bodies, in Shaw's Abridgment of Boyle's Works, vol. i. p. 459; and Appendix to the Sceperical Chemif. About the same time Cassius is said to have discovered the precipitation of gold by tin, and that glafs might be tinged of a ruby colour by melting it with this precipitate: though he does not appear, says Dr. Lewis, from his trinit De Auro, to have been the discoverer of either. He describes the preparation of the precipitate and its use, but gives no account of the manner of employing it; only that he says, one dram of gold, duly prepared, will tinge ten pounds of glafs. See Gold precipitate with tin.

This procfs was soon after brought to perfection by Knuckel; who says, that one part of the precipitate is sufficient to give a ruby colour to 1280 parts of glafs, and a fnallfn redness to upwards of 1600 parts; but that the success is by no means confant. Knuckel also mentions a purple-gold powder, refembling that of Neri, which he obtained by infipitating solution of gold to drynefs, abstracting from it the aqua regia three or four times, till the matter appears like oil; then precipitating with strong alkaline ley, and wafting the precipitate with water. By diffusing this powder in spirit of falt, and precipitating it again, it becomes, he fays, extremely fair; and in this flate he directs it to be mixed with a due proportion of Venice glafs.

Ofrach in his treatife entitled 3ol nere Verde, gives the following procfs for producing a very fine ruby. He directs the purple precipitate, made by tin, to be ground-with six times its quantity of Venice glafs into a very fine powder, and this compound to be very carefully mingled with the frit or vitreous composition to be tinged. His frit consists of equal parts of boras, nitre, and fixed alkaline falt, and four times as much calcined flint as of each of the farts; but he gives no directions as to the proportion of the gold precipitate, or mode of folution. Hellot describes a preparation, which mixed with Venice glafs, was found to give a beaufiful purple enamel. This preparation consists of equal parts of folution of gold, and of folution of zinc in aqua regia, mixed together with the addition of a volatile falt prepared from falt ammoniac, in quicklime, in fufficient quantity to precipitate the two metals. The precipitate is then gradually heated, till it acquires a violet colour. However, though a purple or red colour, approaching to that of ruby, may, by the methods above recited, be baked on glafs or enamels, and introduced into the mafs by folution, the way of equally diffusing such a colour through a quantity of fluid glafs is fwall, fays Dr. Lewis, a fecret. The following procfs for making the ruby glafs was communique to Dr. Lewis by an artifit, who afcribed it to Knuckel. The gold is directed to be diffolved in a mixture of one part of spirit of falt, and three of aqua-fortis, and the tin in a mixture of one part of the former of these acids with two of the latter. The folution of gold being properly diluted with water (see Gold precipitate, &c.) the folution of tin is added, and the mixture left to fland till the purple matter has settled to the bottom. The colourles liquor is then poured off, and the purple sediment, while mofit and not very thick, is thoroughly mixed with powdered fmit or fand. This mixture is well ground with powdered nitre, tartar, boras, and arsenic, and the compound melted with a suitable fire. The proportions of the ingredients are 3560 parts of sand, 583 of nitre, 240 of tartar, 240 of boras, 28 of arsenic, 5 of tin, and 5 of gold. Lewis's Com. Phil. Techn. p. 171. 621, &c.

GLASS, suble-opaque, and semi-transparent, may be made of ten pounds of either of the compositions for hard glafs, and one
one pound of well calcined horn, iron, or bone; or an opaque whiteness may be given to glass, by adding one pound of very white alkane to ten pounds of flux glass. Let them be well powdered and mixed, by grinding them together; and then fused with a moderate heat, till they are thoroughly incorporated. A glass of this kind is made in large quantities at a manufacture near London, and used not only for different kinds of vessels, but as a white ground for enamelled in dial-plates and snuff-boxes, which do not require polishing with much fire, because it becomes very white and fusible with a moderate heat.

Glass, Yellow. See Golden-coloured Glass.

Glass-balls, which are circular or otherwise shaped hollow vessels of glass, may be coloured within, so as to imitate the semi-polluted gems. The method of doing it is this: make a strong solution of ichthyocolla, or finginglass, in common water, by boiling; pour a quantity of this while warm into the hollow of a white glass vessel; shake it thoroughly about, that all the sides may be wetted, and then pour off the rest of the moiilure. Immediately after this, throw in red lead, have it lie and turn it about, throw into many places with a tube, and the moilure will make it stick and run in waves and pretty figures. Then throw in some of the painter's blue smalt, and make it run in waves in the ball as the red-lead; then do the same with verdigris, next with opaliment, then with red lake, all well ground; always calling in the colours in different places, and turning the glasses, that the moilure within may run them into the waves. Then take fine paller of Paris, and put a quantity of it into the ball; shake it alto nimibly about; this will every where fickle firmly to the glasses, and give it a strong inner coat, keeping all the colours on very fairly and strongly.

These are set on frames of carved wood, and much esteemed as ornaments in many places. Neri.

Glass-drops. See Rupert's drops.

Glass, Frothing of. See Frothing and Looking-glass.

Glass-gall, or sandero, is the cemen of the glairs pots, which arises during the vitrification of the fire. See Glass, Figura.

Glass, Gilding of. See Gilding of enamel and glass.

Glass, Grinding of. See Grinding.

Glass-house Furnace, is the place in which the ingredients, or materials of glass are fused and vitrified. There are three kinds of furnaces used in the glass-works. The first, called the "calcine" furnaces, serve for preparing or calcining the fire. It is made like an oven, 10 feet long, 6 feet broad, and two deep. The fuel, which is sea-coal, is put in a trench, on one side of the furnace, and the flame reverberates from the roof back upon the frit. The coals burn in an iron grate, and the ashes fall thence into holes underneath.

The second is the "working furnace," in which the ingredients are melted, and the glass is made. Its figure is round, resembling a dome, three yards in diameter, and two high, supported on arches, beneath which is a large space for a brisk and copious draught of cold air from without; round the inside there are arranged eight or more pots, and these piling-pots, every where closed except at one face opening, which communicates with a small recess formed by the ultimate projections of the masonry and flues of the oven or kiln, in which recedes the workmen's fire. The furnace has two passages, the lower, separating the pots from the fire-place, has a circular hole in the centre covered with a grate, through which the flame pusses from the fire-place into the furnace, being afterwards reverberated from the arched sides and roof to the melting-pots, and passing out with the smoke through the top of the dome, which is strengthened into a chimney for the space of a few feet. The second partition divides this from the hear or annealing furnace, through the bocces, or working-holes, when there are more than one, the metal is taken out of the pots and the pots put into the furnace; the bocces are flapped with moveable covers, made of flue and brick to screen the eyes of the workmen from the fire; and sometimes on each side of the bocce is a beccacera, out of which coloured glass, or fine metal is taken from the piling-pot.

To the furnace likewise occasionally belong ovens, or holes near the hear, for the calcining of tarter, iron, &c.

The hear, which serves to anneal and cool the vessels, and which Agricola makes a particular furnace, consists of a tower, beside the hear; the tower has directly over the melting furnace, with a partition betwixt them about a foot thick, having an aperture called secino, or lanella, through which the flame or heat ascends out of the furnace into the tower; on the floor or bottom of this tower, the vessels, fashioned by the artificer, are set to be annealed; and as the flame has here a lot's degree of intensity than that which is fulfilled by the pots, the vessels, after they have been formed, are slowly and gradually, this being usually two or three months, by which the glasses are put in with a fork, and placed on the floor. The hear is an avenue, five or six yards long, continued to the tower; through this the glasses, when annealed, are drawn in iron pans, called frecker, by which they come to cool by degrees, being quite cold by the time they reach the mouth of the hear, which enters the "favole," or room where the glasses are to be fet.

The third is the "green-glass furnace," which is a kind of compound of all the former. It is made square, (the two former being circular,) having an arch at each angle for annealing and cooling the glasses. The metal is wrought on two opposite sides, and on the other two they have their calcaries, into which are made litre-holes for the fire to come from the furnace, to bake the frit, and also to discharge the smoke. Fires are made in the arches to anneal the vessels, so that the whole process is done in one furnace. The materials with which the inides of these furnaces are contracted are not ordinary brick (which would soon melt into glass, as would also all the latter stones,) but hard and prime kinds, called by Imperator "pyramachia." But when bricks are used, they should be formed of an earth which pollutes in the highest degree the qualities of density and infusibility, for refilling the fire, which continues to act upon them, without cessation for a long time; as the fires in a glais-house are seldom sufficed to go out, from the time when the furnace is first employed till it needs repair, and the interval may be two or three years; the walls of the furnace, for this reason, as well as the pots, are constructed chiefly of clay, mixed with sand, and other materials of a refractory kind, in due proportion. See Glass-pots.

Glass of lead, a glas made with the addition of a large quantity of lead, of great use in the art of making counterfeit gems. The method of making it is: put a large quantity of lead into a potter's kiln, and keep it in a state of fusion with a moderate fire, till it is calcined to a grey loofe powder; then spread it in the kiln, and give it a greater heat, continually stirring it to keep it from running into lumps; continue this several hours, till the powder becomes of a fair yellow; then take it out and sift it fine; this is called calcined lead.

Take of this calcined lead fifteen pounds, and crystalline, or other frit, twelve pounds; mix these as well as possible together; put them into a pot, and let them in the furnace for ten hours; then call the whole, which will be now perfectly melted, into water; separate the loofe lead from it, and return the metal into the pot; and after flanging in fusion
fusion twelve hours more, it will be fit to work. It is very tender and brittle, and must be worked with great care, taking it slowly out of the pot, and continually wetting the marble it is wrought upon. Neri.

It is well known, that cermis, or white lead, minium, litharge, and all the other preparations and calces of lead, are, at least, if not of a moderate fire, and baked into a transparent glass of a deep yellow colour. But this glass is so penetrating and powerful a flux, that it is necessary to give it a greater confidence, in order to render it fit for use. With this view, two parts of calc of lead, e.g. minium, and other parts of sand, or powdered flints, may be put into a crucible of refractory clay, and baked into a compact body. Let this crucible, well closed with a luted lid, be placed in a melting furnace, and gradually heated, for an hour, or an hour and a half; and afterwards let the heat be increased, so as to obtain a complete fusion, and continued in that state for the same time: let this crucible remain to cool in the furnace, and when it is broken, a very transparent yellow-coloured glass will be found in it. Some add nitre and common salt to the above mixture, because these salts promote the fusion and the more equal distribution of the sand. This glass of lead has a considerable specific gravity, and its lowest part is always the heaviest. It is an important flux in the affrays of one's to facilitate their fireifications.

Glasses of lead is capable of all the colours of the gems in very great perfection. The methods of giving them are these: for green, take polverine frit twenty pounds, lead calcined fourteen pounds; mix both in the pot upon the fire; then mix them into a glass, separating the unmixed lead, by planting the mass to water; after this return it into the pot, and add braze the calcined five ounces, and one pennyweight of crocus martis made with vinegar; put this in at six different times, always carefully mixing it together; let it finally sate an hour, then mix it together, and take a proof of it; when the colour is right, let it stand eight hours, and then work it. If instead of the calcined braze the same quantity of the calx mortum of the vitriolum venetis be used, the green is yet much finer.

For topaze-colour take crystal frit fifteen pounds, calcined lead twelve pounds; mix them well together, by letting the powders through a fine sieve; then let them into a glass, separating the unmixed lead, by planting the mass to water; after this return it into the pot, and add braze the calcined five ounces, and one pennyweight of crocus martis made with vinegar; put this in at six different times, always carefully mixing it together; let it finally sate an hour, then mix it together, and take a proof of it; when the colour is right, let it stand eight hours, and then work it. If instead of the calcined braze the same quantity of the calx mortum of the vitriolum venetis be used, the green is yet much finer.

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Glasses, Painting in. The primitive manner of painting in glasses was very simple, and of consequence very rude: it consisted in the mere arrangement of pieces of glass of different colours, in some sort of symmetry; and constituted a kind of what we call Mosaic work.

 Afterwards, when they came to attempt more regular designs, and even to represent figures raved with all their finesses, their whole address went no farther than to the drawing the contours of the figures in black, with water colours, and hatching the dresses, after the same manner, on glases of the colours of the object intended to be painted. For the carnations, they chose glases of a bright red; upon which they designed the principal lines of the face, &c. with black.

At last the taste for this sort of painting being considerably improved, and the art being found applicable to the adornment of churches, baiiiacs, &c. they found means of incorporating the colours with the glasses itself, by exposing them to a proper degree of fire, after the colours had been laid on.

A French painter at Marfelles is said to have given the first notion hereof, upon going to Rome, under the pontificate of Julius II. But Albert Durer, and Lucas of Leyden, were the first that carried it to any height.

The colours used in painting on glases are very different from those used either in painting in oil, or water.

The black is made of two-thirds of flakers, or scales of iron, beaten up, and mixed with another third of rockeille, or little glass beads. White, with sand, or little white pebbles, calcined, pounded in a mortar, and afterwards ground on marble; with one fourth-part of salt-petre, added there-to, and the mixture calcined and pulverized over again: to which, when they are ready to use it, is added a little gypsum, or plaster of Paris well ground, &c. For yellow, they use leaf-silver ground, mixed up in a crucible, with sulphur or salt-petre; then well beaten and ground on a porphyry stone; and, at length, ground over again with nine times as much red ochre. Red is made of lathage of silver, and scales of iron, gum Arabic, ferretta, glasses, and blood-done, nearly in equal quantities. This is one of the most difficult colours, and the preparation only to be learned by experience. Green is made of as sulphuret, one ounce; as much black lead, and four ounces of white sand, incorporated by the fire. After calcination, they add a fourth part of salt-petre; after a second calcination, a fifth part more; after which they make a third cohesion before it is used. Azure, purple, and violet, are prepared like green, only leaving out the as sulphuret, and in the lieu thereof using sulphur for azure; periguese for purple; and both these drugs for violet. Carnations are made of ferretta and rockeille. And lastly, colours for the hair, trunks of trees, &c. are made of ferretta, rockeille, &c.

This account of colours we have from M. Felibien's excellent work Des Principes d'Architecture, &c. though it must be owned, that all the painters on glasses do not use them; there being few artists of that kind but have invented their own particular ones, whereof they usually make great secrets. But this is certain, that these above described are sufficient for the best paintings of all sorts; provided the person has but the skill to manage them.

In the windows of divers ancient churches, chapels, colleges, &c. we meet with the most beautiful and lively colours imaginable; such as far exceed any used among us; but it is not that the secret of making those colours is lost; but that the moderns would not go to the expense of them; nor take all the necessary pains; because this sort of painting is not now so much esteem'd as formerly.

Mr. Walpole, in his Anecdotes of painting in England, has traced the history of this art from the reformation, when misguided zeal destroyed most of the monuments of it in our churches, through a series of professors to the present time. Among the later proficients in this art were Isaac Oliver, who painted the windows at Chriftchurch, Oxford, in 1700; William Price, who in the same year painted the windows in Merton chapel; William Price, the son, to whose art we owe the windows at Queen's, New-college, and Madelin, of whom Mr. Walpole says, that his colours are fine, his drawing good,
G L A S S.

good, and his taste in ornaments and Mosaic far superior to any of his predecessors, and equal to the antique. In 1761, Mr. Powell, an auctioneer late of Elfen-house, in London, exhibited the two first auctions of painted glasses imported from Flanders; and undertook also to establish a manufacture of painted glasses: several of the pieces of this ingenious artist exhibited colours varying in perfection with the old paintings.

Those beautiful works, among the painters in glasses, which were made in the glasses-house, were of two kinds: in some, the colour was diffused through the whole body of glasses; in others, which were the more common, the colour was only on one side, scarce penetrating within the substance above one-third of a line; though this was, more or less, according to the nature of the colour; the yellow being always found to enter the deepest.

These glass, though not so strong and beautiful as the former, were of more advantage to the workmen; because, on the fame glasses, though already coloured, they could skew other kinds of colours, where there was occasion to embosser draperies, enrich them with foliages, or represent other ornaments of flowers, etc.

In order to this, they made use of emery, grinding, or wear ing down the surface of the glasses, till such time as they were got through the colour, to the clear glasses: this done, they applied the proper colours on the other side of the glasses. By this means the new colours were prevented from running and mixing among the former, when the glasses came to be exposed to the fire, as will hereafter be shewn.

When the intended ornaments were to appear white, or silvered, they contented themselves to bare the glasses of its colour with emery, without applying any new colour at all; and it was in this manner that they wrought the lights and heightenings on all kinds of colours.

The painting with vitreous colours on glasses depends entirely on the fame principles as painting in enamel; and the manner of executing it is likewise the same; except that in this the transparency of the colours being indispensably requisite, no substrances can be used to form them but such as vitrify perfectly: and, therefore, the great object is to find a set of colours, which are composed of such fusible matter, by the admixture of other bodies may promote their vitrification and fusion; are capable of being converted into glasses; and melting, in that state, with less heat than is sufficient to melt such other kinds of glasses as may be chosen for the ground or body to be painted; to temper these colours, so as to make them proper to be worked with a pencil; and to burn or reduce them by heat, to a due state of fusion, without injuring or melting the glasses which constitutes the body painted. The first thing to be done, in order to paint on glasses, in the modern way, is to design, and even colour, the whole subject on paper. Then they make choice of pieces of glasses proper to receive the several parts, and proceed to divide or distribute the design itself, or the paper it is drawn on, into pieces suitable to those of glasses; having always a view that the glasses may join in the contours of the figures, and the folds of the draperies; that the curvatures and other finer parts may not be damaged by the lead wherewith the pieces are to be joined together.

The distribution being made, they mark all the glasses, as well as papers, with letters, or numbers, that they may be known again; which done, applying each part of the design on the glass intended for it, they copy or transfer the design upon this glass, with the black colour, diluted in gum-water; by tracing and following all the lines and strokes, as they appear through the glasses, with this point of a pencil.

When the first strokes are well dried, which happens in about two days, the work being only in black and white, they give it a slight wash over, with urine, gum Arabic, and a little black; and this several times repeated, according as the shades are designed to be heightened; with this precaution, never to apply a new wash, till the former is sufficiently dried. This done, the lights and risings are given, by rubbing off the colour in the respective places, with a wooden point or the handle of the pencil.

As to the other colours above-mentioned, they are used with gum-water, such as in painting in miniature; taking care to apply them lightly, for fear of effacing the outlines of the design; or even, for the greater security, to apply them on the other side, especially yellow, which is very pernicious to other colours, by blending therewith.

And here too, as in pieces of black and white, particular care must be always had, not to lay colour on colour, or lay on a new layer, till the former is well dried. It may be added, that the yellow is the only colour that penetrates through the glasses, and incorporates therewith by the fire; the red, and particularly the blue, which is very difficult to use, remaining on the surface, or at least entering very little. When the painting of all the pieces is finished, they are carried to the furnace or oven, to anneal or bake the colours. The furnace here used is small, built of brick, from eighteen to thirty inches square: at six inches from the bottom is an aperture, to put in the fuel, and maintain the fire. Over this aperture is a grate, made of three square bars of iron, which traverse the furnace, and divide it into two parts. Two inches above this partition is another little aperture, through which they take out pieces, to examine how the coating goes forward.

On the grate is placed a square earthen pan, six or seven inches deep; and five or six inches less, every way, than the perimeter of the furnace. On one side hereof is a little aperture, through which to make the trials, placed directly opposite to that of the furnaces designed for the same end.

In this pan are the pieces of glasses to be placed in the following manner; first, the bottom of the pan is covered with three strata, or layers of quicklime, pulverized; those strata being separated by two others, of old broken glasses: the design whereof is to secure the painted glasses from the too intense heat of the fire. This done, the glasses are laid horizontally on the left, or uppermost, layer of lime.

The first row of glasses, they cover over with a layer of the fame powder an inch deep; and over this they lay another range of glasses; and thus alternately, till the pan is quite full; taking care that the whole heap always ends with a layer of the lime-powder.

The pan thus prepared, they cover up the furnace with tiles, on a square table of earthenware, closely luted all round; only having five little apertures, one at each corner, and another in the middle, to serve as chimney.

Things thus disposed, there remains nothing but to give the fire to the work. The fire for the two first hours must be very moderate; and must be increased in proportion as the coating advances, for the space of ten or twelve hours; in which time it is usually completed. At last, U
the fire, which at first was only of charcoal, is to be of dry wood: so that the flame covers the whole pan, and even lies out at the chimney.

During the 2d hours, they make assays from time to time, by taking out pieces laid for that purpose, through the little aperture of the furnace, and pane, to see whether the glass be perfect, and the other colours in good order. When the annealing is thought sufficient, they proceed with great haste to extinguish the fire, which otherwise would soon burn the colours, and break the glazes. See Painting.

GLASS, painting on, by means of stains. See Back-printing.

GLASS, polishing of. See Polishing and Grinding.

GLASS-porcelain, the name given by many to a modern invention of imitating the china-ware with glasfs. The method given by M. Reaumur, who was the first that carried the attempt to any degree of perfection, is delivered by that gentleman in the Memoirs of the Academy of Sciences of Paris, to this effect. This change of glasfs was first noticed of by Neumann, who, in distilling milk in a glafs retort, observed, that the bottom of the vessel acquired the appearance of porcelain, which he attributes to the fine white earthy matter of the milk forced into the glasfs by heat. Neum. Chem. Works 5th Dr. Lewis, \(5^{71}\). The means of reducing to powder, with other means vitrifiable substances for forming a paste, to be afterwards made into a sort of a porcelain, has been a contrivance long practised, but it is very troublesome, and the result subject to many faults; but this new ware is made of glasfs alone, and that with much less trouble, and without the reducing it to powder. By this art, vessels of glasfs are changed into vessels of a sort of porcelain, without altering their form, and the meanest glasfs made only of sand, lime, and stable ashes, forces as well as the bell for that purpose: our common coarse green quart-bottles, or the great bell glasfs with which gardeners cover their melons, &c. being by this means changeable into a beautiful white sort of porcelain ware; and this is to be done in so easy a manner, and with so small expense, that it requires no more trouble or charges, than that of baking a common vessel of our coarse earthen-ware; and for this reason the vessels of this sort of ware may be afforded extremely cheap.

It is very certain, that all porcelain ware is a sublimate in the state of semi-tranferable; and in order to bring glasfs, which is a wholly vitrifiable substance, into the condition of porcelain, there requires no more than to reduce it to a less perfectly vitrified state.

The question which would naturally start on this occasion, is, whether it be possible to reduce glasfs to a less vitrified state, it having already undergone what is called the last change by fire. But when we consider, that the mass of antimony, the vitrifications of many of the metals, as the glasfs of lead, and the counterfeit gems coloured by the metals, are more or less easily reduced again by chemistry to metals, &c. the reducing of sand, flints, &c. after they are vitrified, at least a little way back toward their native or primitive state, may appear not wholly impracticable, and the attempts which M. Reaumur made on this occasion; called from his name "Reaumur's porcelain." The method of making it is this. The glasfs vessels to be converted into porcelain, are to be put into a large earthen vessel, such as the common line earthen dials are baked in, or into sufficiently large crucibles; the vessels are to be filled with a mixture of fine white sand, and of fine gypsum or plaster alone burnt into what is called plaster of Paris, and all the interstices to be filled up with the same powder, so that the glasfs vessels may no where touch either one another, or the sides of the vessel they are baked in. The vessel is to be then covered down all round, and the fire continued at the head of the work; for this is only to be put into a common potter's furnace, and when it has stood there the usual time for the baking of the other vessels, it is to be taken out, and the whole contents will be found no longer glasfs, but converted into a white opaque sublimation, which is a very elegant porcelain, and has almost the properties of that of China. Memoirs Acad. Sciences Paris, \(17^{35}\).

The powders which has served once, will do again as well as fresh, and that for a great many times: nay, it seems, ever so often. The cause of this transformation, says Macquer, is probably that the vitrificatory action of the gypsum quits its basis of calcareous earth, and unites with the alkaline salt and saltness of the glasfs, with which it forms a kind of salt or felsenes, differing from the calcareous felsenes, by the interposition of which matter the glasfs acquires the qualities of porcelain. Dr. Lewis, from a variety of experiments on the nature and qualities, and method of producing this porcelain, has deduced the following conditions: 1. Green glasfs converted with white fire received to heat: in a bath: in a bell: or in a crucible: the change proceeded very slowly; but in a strong red heat, approaching to whitness, the thickest pieces of glasfs bottles were thoroughly changed in three hours. 2. The glasfs sustained the following progression of changes. Its surface first became blue: its transparency was diminished, and when held between the light and the eye, it appeared of a yellowish hue: afterwards it was changed a little way on both sides into a white sublimation, externally still blue: and as this change advanced still farther and farther within the glasfs, the colour of the vitreous part in the middle approached nearer to yellow: the white coat was of a fine fibrous texture, and the fibres were disposed nearly parallel to one another, and transverse to the thickens of the piece: by degrees the glasfs became throughout white and fibrous, the external blacknesses at the same time going off, and being succeeded by a dull whiteness or dun colour: by a still longer continuance in the fire, the fibres were changed gradually from the external to the internal part, and converted into glass; and the texture then, was not united, but merely composed. The first fibrous and somewhat glistening appeared afterwards larger and diller, and at length the sublimation of the glasfs became porous and frisible, like a mass of white sand thinly cohesion. 3. Concerning the qualities of the converted glasfs Dr. Lewis observes, that the whitenss of the internal part was not inferior to that of porcelain, but that the surface was the best beautiful; that the thick pieces were quite opaque, and that several thin pieces were semi-transparent; that while it remained in a fibrous state, its hardnes became greater than that of glasfs; or of the common kinds of porcelain; it was capable of subduing sudden changes of heat and cold better than any porcelain; and in a moderate white heat, it was flexible into a sublimation not fibrous, but vitrisc and smooth, like white enamel: that when it texture had been coarsely granulated, it was now much softer and unprofitable; and lastly, that when some coarsely granulated imperfect pieces which, with the continuance of a moderate heat, would have become porous and frisible, were suddenly exposed to an intense fire, they were rendered remarkably more compact than before; the solidity of some of them being superior to that of any other ware. 4. No differences appeared in the internal colour, hardnes, texture, or the regular succession of changes, from the use of different cementing substances; though
though in external appearances the differences were considerable. All the pieces which had been surrounded with charcoal or with foot were externally of a deep black colour, which did not disappear by exposure to a strong fire during an hour, with free access of air. Coloured clays and frits communicated different shades of a brown colour; and white clays gave whitish, greyish, or brownish tinges. White frit, calcined frits, and gypsum, gave in general the greatest whitenesses, and tobacco-pipe clay the greatest glossiness and brightness. Glazes composed of earths without alkaline falt, glazes of lead, fmit-glazes, crown-glaees, looking-glass plates, a glaze prepared with calcined frits and a fixed alkaline falt, and even green glazes which had been fused together with a ninth part of alkaline falt, suffered none of the above alterations by cementation. Green bottle-glazes and common window-glasjes were most susceptible of those alterations. 6. The changes produced by cementation could not proceed from any absorption of matter from the cementing fubstance; because no increase of weight was given, and because the same changes were produced upon a piece of glases merely by heat, without any cementing fubstance. See Com. Phil. Trans. p. 350—555.

Mr. Gregory Watt, in his valuable paper on bafalt (Phil. Trans. for 1834, cited by Aikin,) alleges this porcellaneous change of glases as an illustration of his important principle, viz. "that bodies whose fibres have a natural tendency to a crystalline arrangement, or a polarity, when vitrified by a sufficient heat and cooled hastily in the vitreous state, are able subsequently to return to their natural crystalline arrangement of fibres, when exposed to a heat merely sufficient to soften the texture, though not enough for fusion. This, in the instance of bafalt, he flew by the singular crystallizations formed in the cells of fused bafalt, long after it had lost the liquidity of fusion. The circumstance of no material change occurring in the weight of glases by this conversion into the fibrous state, flew incontestably that it cannot be owing either to any thing gained during the process, nor to any material loss of the alkali; and this is also rendered manifest by its return to the vitreous state and vitreous qualities when again melted. This too may again be porcelaneous in the same way, and again be melted into glases, and so on alternately." See Porcelain.

Glass-pots, the vessels in the glases manufacture used for melting the glases. Those for the white glases works are made of a tobacco-pipe clay, bought from the Ille of Wight, which is first well wallled, then calcined, and afterwards ground to a fine powder in a mill; which being mixt with water, is then trod with the bare feet till it is of a proper consistence, to mould with the hands into the proper shape of the vessels. When these are thus made, they are afterwards annealed over the furnace. Those for the green-glases work are made of the nonfuch, and another fort of clay from Staffordshire; they make those so large as to hold three or four hundred weight of metal. And besides thse, they have a small fort called piling pots, which they set upon the larger, and which contain a liuer and more nice metal for the nicest works. Nerig.

The clay that is used for this purpose should be of the purest and most refractory kind, and well c‘anoned from all sandy, ferruginous, and pyritic matters; and to this it will be proper to add ground crucibles, white fand, calcined frits duly levigated, or a certain proportion of the same clay buried, and pounded not very finely. The quantity of baked clay that ought to be mixed with the crude clay, to prevent the pots from cracking when dried, or exposed to a great heat, is not absolutely determined, but depends on the quality of the crude clay, which is more or less fat. M. D'Antic, in a memoir on this subject, proposes the following method of ascertaining it; the burnt and crude clay, being mixed in different proportions, should be formed into cakes, one inch thick, and four inches long and wide. Let these cakes be slowly dried, and exposed to a violent heat, till they become as hard and as much contracted as possible, and in this state be examined; and the cake, he says, which has suffered a diminution of its bulk equal only to an eighteenth part, is made of the best proportions. He observes, in general, that most clays require that the proportion of the burnt should be to the fresh as four to five.

It is of great importance that the material of which the pots are made should be carefully selected, as they are exposed to the action of a very fierce fire, and also to the fervent activity of the glases with its powerful fluxes. They should also be made very thick and strong, as they are intended to last for many months. When finished, they are placed in a warm room in order to discharge their moisture, and any small figures arising from the unequal shrinking of the clay are closed by gently beating with a mallet. They are afterwards gradually heated in a small oven, constructed for this purpose, and slowly brought to a red heat; and after remaining for some time in this state, they are removed to the furnace, and fixed down in their places by fire-clay. Here, on account of a further shrinking, they remain for a day or two before they are fit for receiving the glases materials. Pots of this kind are said to last, at an average, about a year.

Glass Tubes are of various lengths, diameters, and forms, according to the purposes to which they are applied. These are often formed with the lamp and blow-pipe, in the manner described under the article Lamp-Blowers. In this way tubes are sealed hermetically (see Hermetical Seal,) tubes are bent, others are joined, bulbs are annexed to tubes for thermometers, &c., and glases is drawn out into threads.

It has been observed, that glases tubes laid before the fire in a horizontal position, and with their extremities supported, have had a rotatory motion about their axes; and also a progressive motion towards the fire, even when their supports are inclined from the fire, so that the tubes will move a little upwards. See Phil. Trans. N° 476. § 1.

When the progressive motion of the tube is stopped by any obstacle, its motion about its axis will still continue. When the tubes are placed in a nearly upright posture leaning to the right hand, the motion will be from left to right; but if they lean to the left, the motion will be from right to left; when the nearer they are placed to the perfectly upright posture, the left the motion will be either way.

If the tube be placed horizontally on a glases plate, the fragment, for instance, of coach window-glasses, instead of moving towards the fire, will move from it, and about its axis, in a contrary direction to what it had done before. Nay, it will recede from the fire and move a little upwards, when the plane inclines towards the fire.

Neither the draught of air up the chimney, nor attraction or repulsion, are the cause of these phenomena. It seems rather owing to the feeding of the tube towards the fire; for allowing such swelling, gravity must pull the tube down, when supported near its extremities horizontally; and a fresh part being exposed to the fire and swelling out again, will fall down again, and so on successively; which will produce a rotatory motion towards the fire.

If the tube be supported by two other tubes, and these be brought near to each other, and to the centre of the supported tube, then its parts hanging over on each side, being larger than the part which lies between the supports, will,
by their weight, pull downwards, and consequently force the middle part, refting upon its two props, upwards; and being lefs advanced towards the fire, as being lefs heated, will, by their oblique situation, pull the middle part backwards also from the fire, which will caufe a rotary regenerative motion, quite contrary to what the tube had when supported near its extremities. And when a fingle tube lies inclining opposite to the fire, either to the right hand or to the left, out of a plane perpendicular to the surface of the fire, gravity will not permit the curved part to reft, but pull it down till it coincides with a plane perpendicular to the horizon; and consequently, as new curvcs are generated, new motions will be fo too; that is, the tube will be made to move about its axis, with this difference, when the tube inclines to the right hand, the motion will be from east to west; when to the left hand, from west to east. The juftnefs of this reafonmg is made manifefl, by bending a wire, and supporting it firft near its extremities, then near its centre on each fide, afterwards inclining it to the right and to the left; the bending in every cafe refpefting the curved part of the tube next the fire. This folution of the phenomena is rendered the more probable from hence, that if four supporters were made use of, one at each extremity, and two near the middle, there was no motion at all, either backward or forward. Nor does the increafe of contact hinder the motion, because the plate of glafs was fo broad as to have a much greater contact with the tube, and yet both the rotary and regenerative motions were manifefl.

These experiments succeeded with tubes about twenty or twenty-two inches long; the diameter about one-eighth of an inch; and they had in each a pretty strong pin hard in cork, for an axis to roll with on the supporting tubes.

Phil. Trans. N. S. 178.

GLASS, &c. how to cement the crofts of. See CEMENT and REPAIRER.

GLASS, how to take the impression of antique gems in. See GEM.

The property which glafs possesses in common with other substances of being expanded by heat, and contracted by cold, was long ago obferved and evinced by Mr. Hook. See Birch's Hift of the Royal Society, vol. i. p. 411. See THERMOMETER.

GLASS, Law relating to. No glafs shall be imported into Ireland, other than the manufacture of Great Britain, on pain of forfeiting the fame, and fhip, and 10s. a pound. 19 G. II. c. 12. If any foreign glafs shall be landed or unshipped before entry and payment of the duties, or without warrant from the proper officer, the fame shall be forfeited, or its value; and the master or other perfon having command of the veffel, and every other perfon concerned in such landing or unloading, shall forfeit 100l. 17 G. III. c. 39. And by 58 G. III. c. 33, for preventing the fraudulent importation of glafs, every package containing any plate or plates of glafs unframed, being plate, crown, or fleet glafs, which shall be imported, or brought into this kingdom for exportation, shall be marked on the outside in Roman letters four inches long at lead, with the word GLASS, on pain of forfeiture, together with the package, and all goods contained in it. The matter of the veffel importing fuch package, fhall, in reporting his cargo, express every fuch package of glafs, on pain of forfeiting the fame, and also 100l. Nor fhall any fuch package be imported, which fhall not contain 500 weight, on pain of forfeiture; but not extending to any part of glafs 60 inches in length or upwards, on account of the package not being marked. By 43 G. III. c. 69. For every 100 weight of materials, &c. that shall be made use of in Great Britain for the making of plate or fleet glafs,
Buildings of this kind may be constructed, occasionally, either against some ready-built south wall, which serves for the back, or against any other part of the building which will admit of being built up; or detached in a similar situation, so as to shew the whole wall may be fluted from the south; the back being framed of brickwork, &c. or of wood double planked; but the former is preferable; the whole being generally ranged lengthways, nearly in an east and west direction.

The dimensions may be from five to six, or eight to ten feet in width, by ten, fifteen, or twenty feet in length or more, as may be required; and from six or eight, to ten feet high behind, by five or six, or seven or eight, in the front. Both ends in proportion with the top, sloping gradually, as suit noticed, from the back, having an entrance, or door, in front, or at one end. The glass-work should be made to slide readily backwards and forwards.

Sometimes fire-places are carried along the back and front internally, proceeding from an external furnace, for occasional fire-heat in winter, which renders them more convenient and useful for various purposes.

These cafes, as mentioned above, are used as preparatory departments, in which to winter many sorts of curious exotics of the harder greenhouse kinds, which only want protection from severe cold, as well as many choice kinds of the open ground, which are rather tender than in their minor growth, or any other particular or curious hardy plants, whether flowers, shrubs, or young trees, especially the choice evergreen kinds, which require effectual protection from the ravages of rigorous frosts or cutting winds, in winter or early spring; and, at the same time, in mild open weather, to enjoy the full air by opening the glasswork; all which, being in pots, can be readily put out in the greenhouse, or may be kept in the coldframe, if the weather be severe, and be thus kept in good condition till settled weather in spring, &c.; then removed into the full air.

In summer and autumn, when unoccupied in this way, these cafes may be of some utility to place some curious kinds of tender plants in, when in flower for feeding, to guard them from heavy or incessant rain, or cold night dews in autumn, which, in many sorts of plants, retard, or sometimes wholly frustrate their production of good seed, in as many sorts of curious tender annuals; particularly the fine double balansaums, cock's-combs, tricolours, double iramouniums, diamond feodics, and various others.

They are also capable of being used in spring and the early part of summer, as in April, May, and June, as a kind of drawing-frames, for some particular sorts of curious annuals to bring them to a tall growth, such as the large or giant cock's-combs, tricolours, double iramouniums, double-striped balansaums, egg-plants, &c. the plants being first raised in hot-beds, under garden-frames, till of twelve or fifteen inches height, then a hot-bed made in the glass-cafe, carted at top, and the plants in pots, thinly planted into the earth of it; the glasswork, in these cafes, should be that close, only a necessary admission of fresh air being given every day, by which they run up to a tall stature in the best perfection of strength for flowering. See Annual Planets.

These sorts of glass-cafes are also sometimes made use of as a kind of appurtenances to hot-houses, or stoves, detached from them, having, as observed above, internal flues for fireheat, when necessary, serving as preparatories for many sorts of exotics, which are tenderer than common greenhouse plants, but do not require the constant full heat of the more tender hot-house kinds, but only the affinities of moderate fireheat in winter, in cold nights, or when very damp, cloudy, foggy-weather and severe frosts prevail. They are sometimes used in the business of forcing different kinds of flowering plants and esculent, either by means of an internal bark-bed, or flues for fireheat.

When intended for this purpose, it is convenient to have both an internal pit for a bark-bed, and flues for fireheat, in order to use either separately, or sometimes both, as may be found necessary. See Hot-House.

Glass Faces, in Mining, is a term for the polished surfaces, or flikened sides, which are found in some of the mineral veins in Derbyshire, something like the polishing which is seen on the sides of faults. See Slieken Side.

Glass fibre, called also Scalphy, in Geography, one of the Hebrides, near the N.E. extremity of Harris. It is a small, round island, covered with heath, and indented by the sea. Near its western extremity are two good natural harbours, and on its call point a light-house was erected A.D. 1788. It lies at the entrance of Eas Loch Tarbot. N. lat. 57° 50'. W. long. 6° 40'.

Glass Lead, in Mining, according to Mr. Mawe, "Mineralogy of Derbyshire," p. 105, is an opaque waxy lead-ore found in that county; sometimes also it is transparent and crystallized, appearing as though it had undergone the action of fire.

Glass, Leugh, in Geography, a lake of Ireland, in the county of Doneghoul, near which is a village of the same name, about five miles from the town of Doneghoul. The lake contains 120 acres; and a wood, spreading over a fine bold hill, hangs down to the water in one deep shade, the effect of which is remarkably beautiful. The county around is very fine. Young.

Glasses are distinguished, with regard to their form, use, &c. into various kinds, as drinking-glasses, optic-glasses, looking-glasses, burning-glasses, &c.

Glasses, Drinking, are simple vessels of common glass or crystal, usually made in form of an inverted cone.

Each glass consists of three parts, viz. the calyx or bowl; the bottom, and the foot; which are all wrought or blown separately.

Nothing can be more dexterous and expeditions than the manner wherein these parts are all blown: two of them opened, and all three joined together. An idea is only to be had thereof, by seeing them actually at work.

The glasses chiefly used in England are made of the ashes of horn; crystal glasses being less frequent in use. The exceeding brittleness of this commodity, notwithstanding the caly rate of each glass, renders the consumptio thereof very considerable. For the method of gliding the edges of drinking-glasses, see Gilding on Enamel and Glass.

Glasses, Metallic, in Chemistry, are the oxides, or sometimes the sulphuretted oxides of the different metals, vitrified by heat.

Glasses, Optic, are three made use of to strengthen, improve, or preserve the sight. See Optic Glasses.

Glasscones. See Convexity.

Glasscones, Concave. See Concave.

Glass, Infernal. See Infernal.

Glass, Lenticular. See Lens.

Glass, Manufact. See Manufacturing, &c.

Glass, Plain. See Plain Glass.

Glasses, Piano-Concave. See Piano-Concave.

Glasses, Piano-Convex. See Piano-Convex.

Glass, Telecopes. See Telescope.

Glass, Objet. See Object-Glasses.

Glasses, Eye. See Eye-Glasses.

Glass, Magnifying. See Magnifying.

Glass, Multiplying. See Multiplying.

Glass, Magical. See Ammonia.
GLASS, Perspect. See Perspective.
GLASS,-looking. See looking-glass, mirror, and
FOILING.
GLASS, Burning. See Burning-glass.
GLASS, Weather. See Weather-glass.
GLASS, Capping. See capping-glass.
GLASS, Window. See Window and glass, supply.
GLASS, Axis of a. See Axis.
GLASS, Pole of a. See Pole.
GLASS, Hour. See Hour-glass.
GLASS, Tin. See Bismuth.
GLASS, Watch. See Watch.
GLASS-HOOF, Bent, in Botany. See Anabas.
GLASS-HOOF, Jointed. See salkornia and ker.
GLASSHATTEN, or GLASHITTEN, in Geography, a
town of Hungary, celebrated for its hot-baths, and having
near it some rich gold mines; 7 miles from Schenmitz.
GLASS-HOUSE, Bay, a bay on the E. coast of New
Holland, between cape Moreton, and the Ghafu-houses,
which are three hills, so called by captain Cook in 1779,
for 38° 8' 48" S.
GLASSHUTTEN, a town of Saxony, near which is a
silver mine; 8 miles S. of Dresden.
GLASSIUS, Solomon, in Biography, was born in the
year 1593, and it is supposed he was educated at Jena,
where he was admitted to the degree of doctor of divinity,
and for some time filled the theological chair with distinc-
tious reputation. He was appointed superintendent of
the churches and schools in the diocese of Sax-Gotha, and
exercised the duties of his function with prudence, equity,
and impartiality. He died at Gotha in 1596, and left be-
hind him, as a memorial of his fame and learning, a work
published in quarto in 1623, entitled "Philologia Sacra,"
which is pronounced by Molinus an ineflaimable and immor-
tal work, than which none can be more useful for the inter-
pretation of Scripture, as it throws much light upon the
language and phraseology of the inspired writers. He was
author, likewise, of "Chromologia Meiae Propheciae,"
"Chroinologia Mosae et Davidica," "Exegetis Evange-
!icrum et Pelagii," and four other pieces.
GLASSNEVIN, in Geography, a village near Dublin,
In Ireland, remarkable for the very extensive and valuable
botanical garden belonging to the Dublin society. See
DUBLIN SOCIETY.
GLASSY HUMOUR. See Eye and VITREOUS.
GLASTONBURY, in Geography, a market town in
the hundred of Glaston, and county of Somerset, England,
is situated on the great road from Wells to Exeter. The
feite occupied by it was originally called Yewitiwyn, or
the Ghaf Island, and in Latin Avalonia.
A town is said to have been built here; and largely en-
dowed by king Ina about the year 768; in the next cen-
tury it was laid waste by the Danes, and rebuilt by king
Edmund, who granted it many additional privileges. In
1184 it was destroyed by fire, and was again restored by
the munificence of Henry II. The chief celebrity attac-
ted to the town was derived from its abbey; which, during
five centuries, flourished in authority and renown every
other in England, excepting that of Westminster. The
abbots enjoyed a plate of regal fulness, with an income
of nearly 40,000l. per annum, had the title of lords, and
fat with the barons in parliament. The abbey and its
offices occupied an area of land of nearly sixty acres within
the walls.
The late abbot, Richard Whitting, who was the sixteenth
in succession, refusing to surrender his abbey to king Henry
VIII., was, with two of his monks, drawn on a hurdle to
the Torr, near the town, and there hanged; the abbot's
head was set on the gate of the abbey, and his quarters
were sent to Bath, Wells, Bridgewater, and Ichbeler.
It being traditionally recorded, that this was the burial
place of king Arthur, Henry II. ordered a search to be
made, when a leaden crosier was discovered with a Latin in-
scription in rude characters, thus translated: "Here lies
the famous king Arthur, buried in the isle of Avalon." Beneath was found a coffin hollowed out of the solid rock,
wherein were the bones of a human body, suppos'd to be
those of Arthur: which were then deposited in the church
under a monument. Scarcely any vestige remains of these
extensive buildings, except some ruins of the church, part
of a chapel dedicated to Joseph of Arimathea, and the
abbots' kitchen, which seems to be of a more recent struc-
ture than the other offices.
Among the religious relics with which the town and its
environs abound, the most conspicuous is the Torr, or
St. Michael's Tower (on which abbot Whitting was ex-
cuted,) standing on an eminence east of the town, where
was formerly a small oratory, dedicated to St. Michael the
archangel.
The town of Glastonbury consists of two principal streets,
and is divided into two parishes, St. John's and St. Bene-
dict's. It was formerly a parliamentary borough, but was
disfranchised on the confiscation of the abbey in 1539.
A charter of incorporation was granted by queen Anne,
by which the civil government was vested in a mayor, a jus-
tice, eight aldermen, and sixteen burgesses. The principal
buildings are the two parih churches, two meeting-houses,
two almshouses, and a free school. The George, a respectable
inns, was an hospital for the accommodation of pilgrims
returning to the shrine of St. Joseph. In the centre of
the town was formerly a large stone cros, originally appro-
piated to shelter persons who attended the market. It
was taken down about five years ago: but a plate and
description are preserved in the first volume of the Archi-
etical Antiquities of Great Britain. Glastonbury is 130
miles distant from London; has a market on Tuesdays, and
four annual fairs: the population, in 1821, was 410
houses, and 2255 inhabitants, of whom only 124 were
employed in trade, which is chiefly that of manufacturing
wrought lookings.
South-west of the town is Wearall hall, so called from a
tradition that St. Joseph and his companions, weary with
their journey, rolled here; and that St. Joseph flung his
hawthorn staff in the earth; it took root, and constantly
budded on Christmas day. This famous thorn had two
trunks, of which one was destroyed in queen Elizabeth's
reign; the other in the great rebellion; but there are trees,
originally from the old flock, still growing in the gardens
of Glastonbury, and in various other parts of the king-
dom. Collinson's Hill, Somersetshire, 3 vols. 4to. Maton's
Western Counties, 2 vols. 8vo.
GLASTONBURY, a township of America, in the county
of Hampden, and part of Vermont; having only 48 in-
habitants.—Also, a handsome little town in Hartford county,
Connecticut, situated on the E. side of Connecticut river,
opposite to Westerfield; containing 2718 inhabitants.
GLASTONBURY TOWN, in Botany. See VITREOUS.
GLASTUM, from the German word Glas, an old name
for Wood; (see ISATEN) Hence several plants have the
specific name of glasiafida, on account of the similarity of
their leaves to that herb.
GLA

GLATT, in Geography, a river of Germany, which runs into the Neckar, 2 miles N. from Sultz in Wurttemberg.

GLATZ, or Glatten, a town of Germany, in the county of Panser; 4 miles E. of Dornfetten.

GLAV, a river of Switzerland, which runs into the Rhone; 2 miles below Eglisau.

GLATITEN, a mountain of Switzerland; 10 miles S. S. W. of Glarus.

GLATZ, a principality of Silesia, bordering on Bohemia, and surrounded by mountains. The internal territory is mountainous, intersected with vallies, meadows, corn-fields, woodlands and small rivers. It produces wheat, generally sufficient for its inhabitants, and has pasture for a great number of cattle. It contains quarries of mill-stones, freestone, and marble; as well as a great variety of precious stones. It has also mines of coal, copper, and silver; with several mineral springs. From 1561 to 1742, Glatz was annexed to the crown of Bohemia; in 1742 it was ceded by the empires Maria Theresa to Frederick II. king of Prussia, and his heirs. It forms one circle, divided into six districts.

GLATZ, the capital of the principality above-mentioned, is situated on the Neisse, and built on the site of a mountain, having upon its summit a strong castle. The town contains about 400 houses within the walls, and as many in four suburbs. It is a place of considerable trade. It has been frequently pillaged and burnt; 54 miles E. of Breslau. N. lat. 50° 16'. E. long. 16° 26'.

GLATZ, a mountain of Austria; 12 miles S. of Steyr.

GLAVACIA, a town of Walachia; 35 miles W. of Bucharest.

GLAUBER, John Rudolph, in Biography, a celebrated chemist of Amsterdam, who was esteemed the Paracelsus of his age, was born in Germany in the beginning of the sixteenth century. He travelled much in the pursuit of chemical knowledge, and collected many secret processes; and his experiments contributed to throw much light on the composition and analysis of the metals, inflammable substances, and salts. In fact he paved the greater part of his life in the laboratory. He did not always see the proper application of his own experiments, and vainly fancied that he had discovered the panacea, and the philosopher's stone, which were at that time objects of pursuit; and the disappointment of many persons, who had been induced by his promises, contributed to bring the art of chemistry into contempt. His theory is full of obscurity; but his practice has perhaps been misrepresented by those who listened to his vain and pompous pretensions; and who accuse him of a dishonourable trafficking, in first selling his secrets to chemists at an enormous price, of again dispossessing them to other persons, and lastly, of making them public in order to extend his reputation. Glauber published about twenty treatises; in some of which he appears in the character of physician, in others in that of an adept or metallurgist; in the latter he most particularly excelled. However, it would be unjust not to give the praise of acuteness of mind, of facility and address in the prosecution of his experiments, and of extensive chemical knowledge. He was the inventor of a falt, which to this day retains his name in the shops of our apothecaries. The works of Glauber have appeared in different languages; the majority of editions are in German, some in Latin, and others in French. A collection of the whole in Latin was published at Frankfurt in 1658, in 8vo, and again 1659 in 4to. An English translation was published by Christopher Park, London, 1689, in folio. Eley. Dict. Hist.

GLAUBER SALT, native or natural, in Mineralogy, the sulphate of soda of chemists, was discovered by Baron Born in the salt mines of Upper Austria; after which Moenne, Volta, Suckow, Gruenberg, Breitkau, Pallas, and others have added to the list of the localities of this saline substance, which is more frequently found in a native state than has been supposed by some writers. It generally occurs as mealy efflorescence; sometimes massive, seldom tabular or crystallized; in which latter case the crystals are described as acicular and as fixed-framed prisms, more or less flatly acuminiated by three planes, set on the lateral edges, or sometimes on the lateral planes: they are shining: their internal lustre is vitreous. Fracture of the crystals small conchoidal. It varies from transparent to opaque according to its cleavage. It is brittle. Its taste is a mixture of salt and bitter. Besides in the above forms, it occurs also, and most frequently, diffused in certain mineral waters, in the neighbourhood of salt mines and salt lakes, where also the efflorescence is mostly found on morrhain ground, found stone, marble slate, and new walls. For the chemical character of this salt, see Soda, Sulphate of.

Glauber's Salt, in Chemistry and Materia Medica. See Sulphate of Soda.

Glauber's Spirit of Marine Salt. See Muratic Acid.

Glauber's Spirit of Nitre. See Nitre Acid.

Glauberite, a lately discovered mineral, belonging to the class of salts, and of which M. Bronniart has given the description and analysis. This substance (called glauberite by its discoverer, both in honour of the well-known Glauber, and on account of its containing a considerable quantity of the salt which bears the name of that alchimist) was found among pieces of rock-falt brought from Grecua in New Cadle, in crystals resembling those of thumelone, or astatite. They were (chiefly on account of their mode of occurring) mistaken in Spain for gypsums.

The form of these secondary crystals, is that of an oblique very
very short prism with rhomboidal base. The planes of the base are generally smooth and shining; the lateral planes flattened parallel to the edges of the base. Cleavage double, the one parallel to the bases, the other less distinct and parallel to the edges of the base; in all other directions the fracture is vitreous. Hence the primitive form is an oblique prism with rhombohedral base, the obtuse angles of which correspond with the obtuse angles of the secondary prism. The crys- tals are from topaz yellow to nearly colourless; they are transparent, and, provided they are kept dry, preserve their transparency and insolubility when exposed to the air. Their hardness surpasses that of sulphur, but is inferior to that of carbon of lime.

Exposed to an intense heat, the glauberite decrepitates and melts into a white enamel. Immerred in water, its surface is covered by a milk-white crust, which penetrates deeper and deeper, till the whole crystal is white and opaque throughout; taken out of the water and dried, the white crust crumbles into dust, leaving the nucleus, if there be any remaining, unaltered and perfectly transparent. Specific gravity about 2.73.

From M. Brongniart’s experiments it appears, that glauberite is essentially composed of anhydrous sulphate of lime and of sulphate of soda, equally anhydrous. That these two salts exist in this substance nearly in the following proportions:

<table>
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<tr>
<th>Substance</th>
<th>Proportion</th>
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<tbody>
<tr>
<td>Anhydrous sulphate of lime</td>
<td>0.49</td>
</tr>
<tr>
<td>Anhydrous sulphate of soda</td>
<td>0.51</td>
</tr>
</tbody>
</table>

A trace of water, indicated by the calcination, is not brought into account, as little as the accidental admixture of a scarcely perceptible quantity of iron, to which the yellowish colour of this substance appears to be owing.

Mr. B. adds the following observations: the above-mentioned pieces of salt from Ocan, which contain this substance, have generally some clay adhering, which penetrates into the [frz] of the surfaces, but seldom into the substance of the glauberite.

The effervescence on glauberite, when moistened, and the property this salt possess of becoming opaque in water, proceed from this, that the water, by dissolving the sulphate of soda, transforms the sulphate of lime into a foppy sulphate, and thus produces a phenomenon which is the reverse of that exhibited by the hydrophane.

The existence of native sulphate of soda, or Glauber salt, is well known to mineralogists, and, indeed, it has been met with in the neighbourhoods of rock-salt; but this was only as solution in the water of salt-furrows, or as effervescence near salt-mines: in a solid and crystallized state, entirely destitute of water of crystallization, and intimately united with feldspar, it had never before been observed. Even the anhydrous sulphate of soda was almost entirely unknown, till Berthier proved that it constitutes nearly the fifth part of those hard scales found at the bottom of the pans in which the sea-salt is obtained by evaporation.

It remains to be ascertained, under which circumstances the rock-salt occurs which contains the glauberite, and particularly in what relation this latter flatters to it, and whether it occur in the rents or on the surface of the beds. See Journal des Mines for 1808.

Hairy places the glauberite separately at the end of the substances acidifires; and it appears to this mineralogist, that the integral molecules of the two salts of which it is composed exist together in the glauberite. He refers, for an analogous combination, to Leblanc’s experiments, according to which a solution of sulphate of copper and sulphate of iron mixed, yielded crystals composed of these two substances, while their primitive form proved to be that of the latter, which had impressed on this mixture the character of its particular crystallization. The question, therefore, is, whether the glauberite be in a similar case. Its form has, indeed, nothing in common with that of the anhydrous sulphate of lime; but we are totally unacquainted with the crystalline form of the anhydrous sulphate of soda. But even if it should be found that in this case the two molecules combine in such a manner as to produce a third of a different form from either, this circumstance could, according to Hairy’s opinion, not be adduced as an objection against the theory of crystallization, and must be considered as a problem, the solution of which is more interesting to the chemist than to the mineralogist.

GLAUBOTTE, in Geography, a town of Prussia, in Natangen; 14 miles S.E. of Bartenstein.

GLAUCEDO, in Surgery. See GLAYCOS.

GLAUCHA, in Geography, a town of Saxony, in the lordship of Schönburg, on the Mulda, containing about 600 houses; the inhabitants are employed in the manufacture of tuffs: 46 miles W. of Dresden. N. lat. 50° 45’. E. long. 12° 25’.

GLAUCHE, a town of Germany, in the duchy of Magdeburg, adjoining to the town of Hale, but governed by its own magistrates; in which are four feitories, where the languages, theology, mathematics, music, &c. are taught by 120 preceptors.

GLAUCION, in Ornithology, a species of Anis, the grey-headed duck. See DUCK.

GLAUCUS, in Botany, is so named from its glaucous, or sea-green, colour. Whether the plant intended by Pliny as the Yellow Horned Poppy, according to the opinion generally received, or by maritime species of Eselthria, seems a point not easily determined. Dioscorides indicates that the juice of the first-mentioned in its wild state, though he compares it to its gomix xiriom, (which is evidently the Yellow Horned Poppy itself,) saying the plant which yields the gomix, and grows at Jerusalem, has almost the leaves of the gomix xiriom, but thicker, and spread on the ground, strong smelling, and more bitter, yielding plenty of taffron-coloured juice. Possibly this may refer to one of our other species of Glaucom, if not to the common wild lettuce. Most commentators have taken Argemone mexicana for the plant of Dioscorides; but that is a tropical production, unknown in Europe, as we premise, previous to the discovery of America, though now naturalized in the East Indies; see ECHTRUS. Neither does the above description suit this plant, for its leaves are much thinner than those of the Horned Poppy, and their juice pale yellow; nor are they spread on the ground. Matthioli seems to take the drug Gambege for gomix, but this does not at all help us, as to the botanical question, nor has it any probability in its favour—Tourn. Inv. 254. t. 150. Pl. 252. Exs. Pl. 252. Prod. Fl. Græc. v. t. 557. Linn. ins. 26. Germ. t. 155. (Chelidonium; Linn. Gen. 262. Spr. 270. Willd. see, Linn. Gen. 262. Illust. t. 550. t. 2. Mart. Mill. Dict. v. 2.)—Clas and order, Polyander Mamugna. Nat. Ord. Rhusacea. Linn. Papaveracea. Jussif.

Gen. Ch. Cal. Perianth inferior, of two ovate, concave, bluntish, deciduous leaves, often tipped with a point near the summit. Cor. Petals four, large, roundish, slightly concave, nearly equal, with a shining spot near the base. Stam. Filaments numerous, shorter than the corolla, flat, incurved, rather dilated upwards; anthers erect, roundish, of two lobes. Pist. Germen nearly cylindrical, curved, longer than the
the flamine; style none; stigma with two or three lobes, downy. *Papaver.* Pod linear, curved, very long, of two or three cells, and as many contain valves. Seeds numerous, globular, dotted. *Coronaria.* Annual, parallel to the valves, its surface cellular to receive the seeds.

Eff. Ch. Calyx of two leaves. Petals four. Pod superior, long, or two or three cells and two or three valves. Seeds numerous, dotted.

Obst. This genus is very naturally distinguished from *Chelidonium* by its habit, and essentially characterized by having more than one cell in its pod, and no criss to its seeds.

1. *G. luteum.* Yellow Horned-Papery. Scop. Carn. v. 1. 369. Geertn. v. 2. 216. (G. flore luteo; Tourn. Infl. 254.) Chelidonium luteum; Linn. Sp. pl. 724. Engl. Bot. t. 8. Papaver cornutum, flore luteo; Ger. em. 367.)—Stem smooth. Stem-leaves rounded, waved. Pods roughs with minute tubercles. Flowers glabrous.—Native of sandy sea-shores throughout Europe, flowering in summer and autumn. Root perennial, tap-rooted. Whole herb roughs and very glabrous. Stem three to four feet high, spreading, branched, leafy, smooth. Radial leaves numerous, entire, silky in a linear form; the red rounded, wavy or fan-shaped, alternate, leafless, clasping the stem. Flowers solitary, on axillary or terminal flanks, two inches broad, of a full flaming yellow. Their calyx is lypid and deciduous, and the petals last but one day. The pods are often near a foot long, cylindrical, but compressed.

2. *G. fulvum.* Orange Horned-Papery. Sm. Exot. Bot. v. 1. 15. 7. (G. glabrum, flore phlomeo; Tourn. Infl. 254.) Chelidonium cornutum; Donn. Cant. ed. 5. 131.)—Stem smooth. Stem-leaves rounded, waved. Pods rough. Flowers nearly glabrous.—Supposed to be a native of the south of Europe, but we know it as a garden plant only. This differs from the former in the rather more blue cast of its herbage, nearly or quite glabrous flowers, and smaller petals of a rich tawny orange-colour. We have thought the root annual, but we find it will survive a mild winter, about as well as the form species, which indeed is often killed, and never lives many years, at least in a garden. The *G. fulvum,* whether a distinct species or only a permanent variety, propagated by seed and root, its flowers, petals, and leaves, have a singularly elegant effect. Their petals fall, in hot weather, before noon, but in the autumn will endure till the next morning, or longer, which is also the case when they are gathered and placed in a room.
—If our quotation of Tournefort be right, our plant is figured in Lobel's *Icones* 271, f. 2, but not happily.

3. *G. rubrum.* Red Horned-Papery. Sm. Prodr. Fl. Grce. v. 1. 427. (G. orientale, flore magno rubro; Tourn. Cor. 18.)—Stem hairy. Stem-leaves pinnatifid, cut. Pod slightly hairy.—Gathered by Dr. Sibbthorp by the way with Smyrna and Burfa, as well as in the island of Rhodes. The root seems to be annual. Stems spreading, or nearly prostrate, clothed with soft expanded hairs. Stem leaves elongated, and deeply pinnatifid, by which in effect it differs from the preceding, as it does from the following in the soft hairs, instead of rigid bristles, which clothe the pods and stem. The flowers are glabrous, with oblong petals, narrower and flatter than in either of the form species, of a tawny red, with a violet spot on the claw. Lobel's *Papaver cornutum* plancenum alatum, L. 271, f. 1, agrees with this rather than with the last in its petals, and somewhat in its leaves; but if Tournefort be correct, it cannot be designed for the present species, which he gives in his *Corollia* as different from all he had previously enumerated, including Lobel's plant.

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are pendent from the base of the lower mandible on each side, and in texture resemble the wattle of the common cock; the colour at first blue, and afterwards orange. The irides are blue. From the forehead to the eye the colour is deep black; the other parts of the plumage dark ash-colour. The tail long, wedge-shaped, and composed of twelve feathers. Legs long, and the hind claw much longer than the rest.

This bird inhabits New Zealand, where it subsists on berries and insects, and is sometimes seen perched on trees, though rarely, as it is usually seen walking on the ground. Its note is a kind of whistling or rather murmuring noise; and the flesh savoury and delicate.

Glaucum, in Ancient Geography, a promontory of the Libyan name, on the confines of Marmarica and Egypt, upon which was a town of the same name. Prolemny.

Glaucus, a river of the Peloponnesus, in Achaea, near Patras. Paulinus—Alfo, a river of Aia Minor, in Lycia, having its mouth N. E. of the town of Telmissus, in the gulf of Glaucus. Alfo, a river of Asia, in the territory of Colchis, where it discharges itself into the Phasis. Pliny. Alfo, a gulf of Aia Minor, in a direction from N. W. to S. W. More anciently this gulf was denominated the gulf of Telmissus, from the name of the town, situated near its termination in the eastern part of it.

Glaucus, in Ichthyology, a species of Chetodon; which see. Alfo, a species of Scabar. Also, a species of Fucus, which see respectively.


Gen. Ch. Coll. none: unless the corolla be considered as such. Cor. of one petal, five-keeled, bell-shaped, erect, permanent, with oblong rounded lobes. Stam. Filaments five, awl-shaped, erect, one of the corolla; anthers roundish, yellow, German ovate; style uniform, as long as the filaments; stigma capitata. Peric. Capsule globose, pointed, of one cell, with five valves. Seeds five, roundish; receptacle very large, globose, hollowed for the seeds. Effl. Ch. Calyx of one leaf. Corolla none. Capsule of one cell, with five valves and five seeds.

1. G. maritima. Black Saltwort. Limn. Sp. Pl. 301. Engl. Bot. t. 13. This is the only species known, being very frequent in salt-marshes throughout Europe, and flowering in summer. The root is perennial and creeping. Stem about four inches high, erect, somewhat branched, thickly covered with ovate, fiddle-shaped, and fleshy-coloured, purplish, or whitish flowers. Dr. Withering has remarked that cows eat this herb, and that it is used for a pickle, being found everywhere from Lapland to the Archipelago. The description in Dioscorides, book 4. chap. 141. is so exact that it is impossible to be mistaken; yet we do not find this plant in the Pharmacopoeia Florae Germanicae, because Dr. Sibthorp did himself observe it in his journey.

Glaucic, in Geography, a small island in the English Channel, near the coast of France. N. lat. 47 26. W. long 2 56.

Glauser, an artificer or dealer in glazes.

Glausing. The Roman method of glazing some of their urns might give our workmen a hint toward a method greatly superior to any thing now in practice for the glazing of earthen-ware. There is a sort of red urns found in Yorkshire, which are, instead of glazing, covered all over inside and out with a fine coral-coloured varnish, that gives them a beauty, which no earthen-ware of our times can attain; and is not only far more durable than our way of doing it with lead, which is apt to crack and fly, both with wet and with heat, but far more safe and wholesome; and being well known to be a vapourable metal, and its fumes very noxious, there is great reason to suspect that it must be unwholesome when brought to the fire. This ancient glazing feems to have been done either by the brush, or else by dipping, for both the inside and outside are varnished with equal regularity; and something may be grieved at as to the materials they used in it, from what Pliny has left us. This author occasionally observes, that such earthen-ware as was painted with bitumen never loft its beauty; and afterwards, that it was a custom to cover over whole flutes with this sort of glazing, which he observs did not only make a smooth coat, but sunk into the wood-ckese not be likely to crack and fly off like our lead-ccots on plates, &c. which is merely a curl laid over them. Hook's Philos. Collect. p. 89.

A common glazing for any kind of earthen-ware may be made of white sand forty pounds, of red-lead twenty pounds, of pearl-ashes twenty pounds, and of common salt twelve pounds. Powder the sand by grinding it, and then add it to the other ingredients and grind them together: after which calcine them for some time with a moderate heat, and when the mixture is cold, pound it to powder; and when wanted for use, temper it with water. The proportion of these ingredients may be occasionally varied. We may observe, in general, that lead ought to be excluded from the composition of glazings, and other fluxes substituted in its stead. See Colica Damaniorum.

A transparent glazing may be prepared, without lead, by calcing forty pounds of white sand, twenty-five pounds of pearl-ashes, and fifteen pounds of common salt; and proceeding as before: and a more perfect transparent glazing may be made of sand forty pounds, of red-lead, perfectly burnt, fifty pounds, of pearl-ashes ten pounds, and of common salt twelve pounds. The following recipes are taken, for the most part, from Kuckeln, who says that they are the true glazings used at Delft, and other Dutch manufacturies.

Glausing. Black, is made of eight parts of red-lead, iron filings three, copper-ashes three, and zaffer two meafures. This, when melted, will make a brown black; and if you want it blacker, add more zaffer to it.

Glausing. Blue, is thus prepared: take lead-ashes, or red-lead, one pound, clear sand, or powdered flints, two pounds, common salt two pounds, white calcined tartar one pound, Venice or other glais half a pound, zaffer half a pound: mix them well together, and melt them for several times, quenching them always in cold water. If you would have it fine and good, it will be proper to put the mixture into a glaes furnace for a day or two.

Another blue glazing may be formed of one pound of tartar, a quarter of a pound of red-lead, half an ounce of zaffer, and a quarter of a pound of powdered flints, which are to be fused and managed as in the last recipe. Or, take two pounds of calcined lead and tin, add five pounds of common salt, five pounds of powdered flints, and of zaffer, tartar, and Venetian glais, each one pound. Calcine and fuse the mixture as before.

Or, again, take of red-lead one part, of sand three parts, and of zaffer one part. For a violet blue glazing, take four
ounces of tartar, two ounces of red-lead, five ounces of powdered flints, and half a dram of manganese.

Glazing, Brown, is made of red-lead and flints, of each fourteen parts, and of manganese two parts, fused: or, of red-lead twelve parts, and manganese one part, fused. A brown glazing, to be laid on a white ground, may be made of manganese two parts, and of red-lead and white glafs, of each one part, twice fused.

Glazing, Flints-coloured, is made of twelve parts of lead-ashes, and one of white glafs.

Glazing, Gold-coloured. To make gold-coloured glazing, take of litcharge three parts; of sand, or calcined flint, one part: pound, and mix these very well together: then run them into a yellow glafs with a strong fire. Pound this glafs, and grind it into a subtile powder, which moisten with a well saturated solution of silver; make it into a paste, which put into a crucible, and cover it with a cover. Give at first a gentle degree of fire; then increase it, and continue it till you have a glafs, which will be green. Pound this glafs again, and grind it to a fine powder; moisten this powder with some beer, so that by means of a hair pencil you may apply it upon the vessels, or any piece of earthen ware. The vessels that are painted or covered over with this glazing, must be first well heated, then put under a muffle; and as soon as the glafs runs, you must moisten them, by holding them over burning vegetables, and take out the vessels. Mr. Heinicus of Peterborough, who sent this receipt to the Royal Society, uses the words afflare debeb famum, which is rendered finok tham, in the Transactions. Phil. Trans. N 465. 6.

Kuncel gives several preparations for a gold-coloured yellow glazing. This may be produced by fusing a mixture of three parts of red-lead, two parts of antimony, and one part of fahion of Mars; by again melting the powdered mafs, and repeating the operation four times; or, by fusing four or five times a composition of red-lead and antimony, of each an ounce, and of scales of iron half an ounce; or by calcining and fusing together eight parts of red-lead, six parts of flints, one part of yellow ochre, one part of antimony, and one part of white gläs. A transparent gold-coloured glazing may be obtained by twice fusing red-lead and white-flints, of each twelve parts, and of filings of iron one part.

Glazing, Green, may be prepared of eight parts of litcharge, or red-lead, eight parts of Venice glafs, four parts of brafl-dufl, or filings of copper; or, of ten parts of litcharge, twelve of flints or pebble, and one of red-lead, or copper-ades.

A fine green glazing may be produced by using one part of the Bohemian granate, one part of filings of copper, one part of red-lead, and one part of Venetian gläs; or by fusing one part of white gläs, of the same quantity of red-lead, and also of filings of copper; powdering the mafs, and adding one part of Bohemian granate to two parts of this powder. A fine green may be obtained by mixing and grinding together any of the yellow glazings with equal quantities of the blue glazings; and all the shades and tints of green will be had by varying the proportion of the one to the other, and by the choice of the kind of yellow and blue.

Glazing, Iron-coloured, is prepared of fifteen parts of lead-ashes, or red-lead, fourteen of white sand, or flints, and five of calcined copper. This mixture is to be calcined and fused.

Glazing, Liver-coloured, is prepared of twelve parts of litcharge, eight of salt, fift of pebble or flint, and one of manganese.

Glazing, Purple-brown, consists of lead-ashes fifteen parts, clear-sand, or powdered flint, eighteen parts, manganese one part, and white glass fifteen measures; to which four add one measure of zaffer.

Glazing, Red, is made of antimony three pounds, litcharge, or red-lead, three, and ruff of iron, one; grind them to a fine powder. Or take two parts of antimony, three of red-lead, and one of calcined fahion of Mars, and proceed as before.

Glazing, Sea green, is made of five pounds of lead-ashes, one pound of tin-ash, three pounds of flint, three quarters of a pound of salt, half a pound of tartar, and half a pound of copper dust.

Glazing, White. A fine white glazing for earthen-ware is thus prepared: Take two pounds of lead, and one of tin; calcine them to ashes: of this take two parts, calcined flint, white sand, or broken white gläs, one part, and the other part: mix them well together, and melt them into a cake for use. The trouble of calcining the tin and lead may be prevented, by procuring them in a proper flate.

The white glazing for common ware is made of forty pounds of clear sand, fifty-five pounds of litcharge, or lead-ashes, twenty-five of pot-ashes, and ten pounds of salt: these are three times melted into a cake, quenching it each time in clear cold water. Or, it may be made of fifty pounds of common sand, seventy-five of lead-ashes, thirty of wood-ashes, and twelve of salt.

A very fine white glazing may be obtained by calcining two parts of lead, and one part of tin; and taking one part of this mass, and of flints and common salt, of each one part, and fusing the mixture. See Delf-ware.

A white glazing may be prepared by mixing one hundred pounds of multicol, fifty-five pounds of red-lead, twenty pounds of calcined tin or putty, and ten pounds of common salt; and calcining and powdering the mixture several times.

Glazing, Yellow, is prepared of red-lead, three pounds; calcined antimony and tin, of each two pounds; or, according to some, of equal quantities of the three ingredients. These must be melted into a cake, then ground fine; and this operation repeated several times: or, it may be made of fifteen parts of lead-ore, three parts of litcharge of silver, and fifteen parts of sand.

A fine yellow glazing may be procured by mixing five parts of red-lead, two parts of powdered brick, one part of sand, one part of the white glazings, and two parts of antimony, calcining the mixture and then fusing it. Or, take four parts of white gläs, one part of antimony, three parts of red-lead and one part of iron scales, and fuse the mixture; or, fuse sixteen parts of flints, one part of iron-filings, and twenty-four parts of litcharge. A light yellow glazing may be produced with ten parts of red-lead, three parts of antimony, and three of glass, and two parts of calcined tin. See Gold-coloured Glazing.

Glazing, Ciron-yellow, is made of six parts of red-lead, seven parts of fine red brick-dust, and two parts of antimony. This mixture must be calcined day and night for the space of four days, in the ah-hole of a glafs-house furnace, and at last urged to fusion.

Glazing of Delf-ware. See Delf-ware.

Glazing of Porcelain. See Porcelain.

Glazing of Stone-ware, and Queen's ware. See Porcelain.

Glazing for Tobacco Pipes. See Tobacco-pipes.

Glazing, in Painting, a term of the art, expressive of a peculiar mode or variety in the practice of it. It consists in laying a transparent colour, made very thin by a great quantity of oil, or other vehicle, over a field body of opaque colour.
GLAZING.

colour: and its intent is, to give a greater degree of clearness and brilliancy to the colour produced by this process, than can be obtained by mixing together in imitation the two colours thus employed. In this mode their hues are blended, without disparagement of each other; whereas, in mixing them in the ordinary way, a certain diminution of their brilliancy takes place, produced by the different nature of their qualities.

Glazing appears to have been practised very early in oil-painting; and probably the use of varnishes over pictures painted with water-colours may have first shown its utility. Indeed it could not fail to be the case, if the varnish employed happened to be tinged with any colour; for the latter pictures acquired by that circumstance must be strikingly engaging: a harmony and sweetness are thereby gained, which all other means are vainly employed to obtain. It is therefore surprising that all those who practised the art of painting after the discovery of the use of oil, should not have given it to the application of it. Yet it is certain that the Roman school is remarkably deficient in the knowledge of the value of this practice, and most frequently neglected to use it; owing probably to the employment painting found in fresco. The Venetian and Dutch schools, on the other hand, employed it in perfection, and it is in their works that a knowledge of it may best be acquired.

The principal difficulty attending the use of glazing, is to avoid the too common application of it; as it does not suit the representations of all subjects, in its more immediate sense; though one general glaze over a picture, completed in its forms, will at all times benefit the work; if it happens not to be too low, or impudic, in its tones of colour.

All kinds of gems and polished substances, such as metals, filks, velvets, &c. are imperfectly wrought to effect, when it is not employed; and which, which is in nature compounded of a great variety of colours, is seldom quite perfect in its hue, when glazing is not employed to finish with. It is a species of it, produced by the yellow varnish being but partially removed from old pictures, which gives them their peculiar and brilliant luster. It is quite impossible to make any effect exactly like it with fresh colours, unless some artifice be used to furnish the effects of time; such as rubbing in dirt, and then partially removing it, &c. tricks which picture dealers are perfectly conversant with; and by which many an ingenious copy is passed off upon the unlearned amateur, to the enhchment of the dealer, and the future annoyance of the buyer, when time and improved information let him into the secret.

Glazing is the most valuable part of the practice of painting, when judiciously employed; as it produces clear broken tones of colour, which leave no reminiscence of the palette, but deceive the eye by the variety of hues, and dazzling effect of light, produced by one colour shining through another in different degrees of illumination; much more like the effects of natural objects, than the use of opaque colours can possibly produce. But then great dexterity and judgment are required to use it properly in so general a manner. A well-informed and scientific artist knows the tone which one colour glazed over another will produce; and without that knowledge, a dirty dulness may be the effect, instead of the cleaned required: and if not successul, it is always injurious; there is no medium in the application of it. If the under colour is not improved, it is soon to be wearied, and it will require repainting, to restore its original freshness. So that when a painter has prepared a work for glazing, which should always be done with great clearness and precision, the most extreme caution is requisite in adapting the tone of the glaze which he proposes to use to the general hue of the picture before he applies it. It is not possible to give rules more explicit on this matter; the indefinite subdivisions of hues which all colours are capable of, must for ever leave to the feeling and judgment of the artist their peculiar application. It is hardly necessary to trace that a glaze of red, over blue, will produce purple; of blue, over yellow, green; and of red, over yellow, orange; but it may aid the student in his practice, if he considers, that all the varieties of tone the original colours are capable of, will, when equally employed, produce a corresponding compound; and, of course, if his picture be of too red a hue, though of a light tone, a corresponding one of blue, or of yellow, will change it to the one he may require; and if he use the blue and yellow together as a green, it will produce a negative colour; totally destroying their red: but the varieties are too complicated and numerous to follow.

GLAZING of Glob. The process of glazing is used for all the flout fabrics of cotton goods, and sometimes for those of linen. It is a part of the general processes of finishing goods for the market, and which is carried on by those who are generally called cloth-hatters, or calender-men. The glazing is done by putting on the cloth a small quantity of white wax, such as that used in the manufacture of wax candles, and the glos is afterwards effected by the friction of any smooth body on the surface of the cloth. By the ordinary process the apparatus is very simple, consisting merely of a smooth table, a little inclined towards the operator, like a common writing desk, upon which the cloth to be glazed is spread smoothly, and drawn over, as occasion requires, from one end of the piece to the other. Above this is a lever, suspended from any convenient fixture to the roof, the lower end hanging in contact with the cloth, and by moving this backward and forward, the necessary friction is produced. The end of the lever next to, and in contact with the cloth, is faced with a smooth piece of flint or pebble, finely polished, and of a cylindrical form, the under surface of which is in contact with the cloth. This lever being drawn backward and forward by the operator's hands, the whole cloth is polished or glazed in succession, the joint at the top of the lever being fitted into a horizontal slider, which allows the polisher or flint to be moved from side to side of the cloth to the other. In this way of glazing, the whole is performed by the power of a man's arms and hands; and, from the position of his body being constantly inclined over the table, is found to be a very laborious and fatiguing operation. The great number of people necessarily employed by this operation, and the difficulty of getting large quantities of goods rapidly glazed to answer the demands of hurried shipments for exportation, suggested lately the idea of a more speedy and efficacious manner of performing the operation of glazing by an improvement and alteration in the construction of the common five-bowl calender. This improvement was planned and executed at the extensive works of the late Mr. John Miller of Glasgow, who furnished the inventor with the means of carrying his plan into effect, and upon a proof of its efficacy on trial, his majesty's royal letters patent for its exclusive use to the inventor or his assigns within Scotland were obtained in the usual form. Two or three machines were then constructed for his own works, to which, as far as we know, they are still confined; and these machines have given the most universal satisfaction to all who have had their goods glazed by them, while at the same time an immense reduction of labour has been effected by their use.

The patent glazing machine, like the common calender, consists of five bowls, or cylinders, four of which are of

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caft iron, smoothly turned, and finely polished on the surface, and the large or intermediate cylinder is generally of plateboard on an iron axis. In the common operation of smoothing by means of the calender, the velocity of the cylinders revolving upon their own axes, is in the ratio of their respective diameters, so that an equal quantity of superficies is constantly exposed of each. In the glazing-calender, or machine, it is only necessary that the motions of one of the cylinders should be so much accelerated as to produce the friction necessary to effect the glazing by rubbing against the other cylinders with which it is in contact, so as not to be liable to tear or otherwise injure the fabric. This motion is produced by means of wheels placed in the following manner: On the axis of the middle cylinder, A, a small hollow wheel of any convenient diameter and number of teeth. This wheel works into the fluid-wheel B, the number of whose teeth is not material to the speed, and whose diameter may be regulated so as to pitch well into the remaining wheels. The wheel is placed to revolve loosely on an iron flord, screwed into the framework of the machine. The fluid-wheel B gives motion to the second fluid-wheel C, and it continues the motion to the wheel D, which is fastened on the axis of the first iron cylinder. The upper cylinder works merely by friction, as in a common calender, and when the intermediate fluid-wheel B is removed by being taken off the fluid, the whole cylinders will revolve exactly as in the common machines, without producing any glazing effect. The simplicity of this machine, the regularity of the glofs which it gives, and the immense saving of labour, are powerful recommendations in its favour. The great quantity also which may be effectuated by it in a very limited time,renders it peculiarly adapted to meet the occasional exigencies of the exporter; and the additional advantage of its facility of adaptation to the purposes of the common calender, when glazing is not required, adds to its value and utility. Upon paying occasions, one of these engines, by being constantly employed night and day, will glaze from 600 to 800 pieces of cloth, of 28 yards each, weekly.

Those employed in the late Mr. Miller's works are driven by means of a steam engine, by which also various other kinds of machinery, adapted to the various operations of the business, are set in motion. Should any machinery of this description be constructed in works where there may be a general necessity of keeping them constantly employed for the purpose of glazing, it will be very necessary that care should be taken that the moving power, whether water, steam, or horsepower, should be ample; as it must be evident, even to those who are not practically conversant with the calculation of power and refititute, that this calender, when employed to glaze, must require considerably greater force to keep it in motion, than when the cylinders revolve in the ratios of their diameters, for the mere purpose of common calendering or smoothing.

We are not in possession of sufficient data to enable us to ascertain, with any tolerable precision, the quantum of reftitute made by the friction; nor are we aware that any accurate experiments have been made for that purpose: But it is evident that it must be very great in all cases. It is reasonable also to infer, that it may be considerably increased or diminished by the texture or fabric of the floff upon which the glazing operation is performed. Hence, if these machines be employed constantly in large works, and set in motion by the same power, which also drives machinery adapted to other purposes, care must be taken that the power be sufficient to effect all the various purposes to which it is applied. And should this be attempted, under the impression that the glazing might be performed by the same power as common calendering, a deficiency would be found, which must render it necessary to diaphragm part of the machinery, in order to give sufficient momentum to the rest. This is, perhaps, one of the most common, and at the same time, most ruinous errors into which the projectors of large works, who are not mechanics, are apt to fall. In the first instance, it is evident, that a large establishment should be set to work at the least possible expense, they too frequently calculate too hardly, and are then obliged either to abandon their whole scheme of a great lobs, to work it under serious and ruinous inconveniences, or to repair, at a triple expense, what they have left deficient at first.

GLAZOV, in Geography, a town of Russia, in the government of Viahs, on the Tchetcza; 95 miles S.E. of Viahs. N.lat. 58° 5'. E. long. 51°.

GLEAN, or GLADE, in Ornithology, a name used in the northern parts of the kingdom for the milvus, or kite. See FALCO MILVUS.

GLEAM is popularly used for a ray or beam of light. Among falcons, a hawk is said to glean when the calls or throws up flint from the goole.

GLEAN, in Geography, a river of England, which rises about four or five miles N. of Stamford in Lincolnshire, and runs into the estuary called the With, five miles N.E. of Spalding.

GLEANING, the act of gathering or picking up the ears of corn left behind, after the field has been reaped, and the crop carried home.

By the custom of some countries, particularly those of Meux and Ellamps, all farmers and others are forbidden, either by themselves or servants, to put any cattle into the fields, or prevent the gleaners in any manner whatever, for the space of twenty-four hours after the carrying off the corn; on penalty of confiscation, &c. It hath been said, that by the common law and custom of England the poor are allowed to cut and glean upon another's ground after the harvest, without being guilty of trespass. Gilb. Jo 253. Trials per pari, ch. 15. 538. This humane provision is to be borrowed from the Mosaic law. Levit. xix. 9, xxiii. 22. Deut. xxiv. 19, &c.

Gleaning is a practice that is little heard of in the more northern parts of the kingdom, but which prevails greatly in some of the southern districts. The custom is of great antiquity; and whether or not the poor have any legal right, in this country, to glean, except by the express permission of the farmer, it has however been so long functioned by its continuance, that it is but rarely interrupted or put a flop to by him.

In some places where it is carried on to excess, it would seem necessary for the farmers to make regulations in respect to it, that should not be broken through on any account whatever. If this be not the case, the abuse is frequently so great that they are much injured by it, "as the poor glean among the flaves, and too often from them," as is notorious to those who have attended to the practice. It has been thereforef suggested to make it a rule not to suffer a gleaner to enter a wheat field until it is wholly cleared of the crop, which would, in the end, prove a very beneficial regulation. It does not, however, upon the whole, appear that much benefit is derived to the poor from the custom, while it evidently leads to idleness, immorality, pilfering, and a host of other abuses.

GLEBA ALANA, a name by which some call the yellowish white tripod.

GLEBI, Additi. The rule of the patrimonage should be annexed to the glebe; i.e. they went with it, were sold with it, &c.

GLEBE,
GLEBE, Gleba, in Natural History, Chemistry, &c. a clod, or piece of stone or earth, frequently containing some metal or mineral.

The clods are carried to the forges to be washed, purified, and melted, &c.

Glebe, or Glebe-land, is properly used for church-land.

Glebe-land is most commonly used for land belonging to a parish-church, before the tithe.

Thus, Lindwood: "Glebe est terra in qua consinit dos ecclesea; generatit tamen furnitur pro foleo, vel pro terra culta." Though in the most general, and extensive use of the word, glebe is applicable to any land or ground belonging to any benefice, see, manor, inheritance, or the like.

If any parson, vicar, &c, hath caused any of his glebe lands to be manured and sowed at his own costs, with any corn or grain, the incumbents may devife all the profits and corn growing upon the said glebe by will. (Stat. 28 H. 8. cap. 11.) And if a parson fows his glebe and dies, the executors shall have the corn sowed by the tector. But if a glebe be in the hands of a tenant, and the parson dies after the levantee of the corn, and before the term is done; it is said, neither the parson's executors or his successor can claim the rent, but the tenant can retain it and allow the crop, unless there be a special covenant for the payment to the parson's executors proportionably, &c. Wood's Inl. 163.

GLEBEC, in Geography, a town of America, in the state of Virginia; 12 miles S.E. of Tappahannock.

GLEBOUS, in Rural Economy, a term sometimes provincially signifying the turf or grasy surface.

GLEBOW, in Geography, a town of the duchy of Courland; 18 miles S. of Wittau.


Gen. Ch. Cal. Perianth of one leaf, tubular, cylindrical, fringed, very small, permanent; its mouth having five sharp unequal teeth. Cor. of one petal, inserted in tube, solitary, compressed; upper lip erect, obtuse, lower lip spreading, larger than the upper one, oblong, three-cleft, its middle lobe larger, emarginate. Stam. Filaments four, under the upper lip, two of which are shorter; each pair of anthers forming themselves into a croos. Pfl. German four-cleft; style thread-shaped, bending under the upper lip; stigma cleft, acute. Peric. none; the calyx nourishing four, ovate feeds in its booms.


1. G. hederaea. Ground-ivy. Linn. Sp. Pl. 827. Engl. Bot. t. 853.—"Leaves kidney-shaped, crenate."—Found in woods and hedges, flowering in April and May. Root perennial, and creeping. Leaves on foot-flabs, dotted beneath with glandular points. Flowers axillary, about three to each leaf, pretty speckled with white and blue. Calyx dilated. Anthers white. Ground-ivy has been so long and so generally known, that it has obtained various apppellations, such as Al-hoo, Gill, Robin-wood-in-the-hedge, Cat's-foot, &c. Before the introduction of Hops its leaves seem to have been used for flavouring and clarifying ale. Gerard has enumerated a long train of "Vertues" supposed to be possessed by this plant; and when infused into tea or honey, it is still a favourite medicine with the common people for coughs. Many animals eat it, though it is said to injure

horses if taken too copiously. The specific character is now superseded, as two species enumerated in the first edition of the Species Plantarum are now referred to other genera.

GLECHOMA. Hederacea, growing wild, in the Materia Medica, is a well known plant, growing commonly under hedges and flowering in April. Ground-ivy has a peculiar strong smell; the leaves, according to Dr. Withering, boiling befet underneath with hollow dots, in which are glands secreting an essential oil, and above with little eminences, which do not secrete any odoriferous oil; for this surface, when rubbed, yields no peculiar scent, whereas the under surface affords a pleasant reviving scent. The taste is bitterish, and somewhat aromatic. This plant was formerly supposed to provide great medicinal powers, not discovered by later experience; accordingly it is omitted in the materia medica by the London college. Its qualities have been described by different authors, as pectoral, detergent, aperient, diuretic, tubercular, corrodorant, erithmic, &c. and it has been recommended for the cure of those diseases to which these powers seem to be most adapted, but chiefly in pulmonary and naphritic complaints. In obilinate coughs it is a favourite remedy with the patients, who, probably deriving benefit from it, pennit in its use. Ray, Mead, and some others, speak of its being usefully joined with fermenting ale; but Dr. Cullen observes, "it appears to me frivolous. In short, in many cases where I have seen it employed, I have had no evidence either of its diuretic or of its pectoral effects. In common with many others of the verticillate, it may be employed as an erithmic, and in that way cure a head-ache, but no otherways by any specific quality." It is usually taken in the way of infusion, or decoction, as tea. Woodville Med. Bot.

GLECHONITES, a name given by the ancient Physicists, to a sort of wine impregnated with penny-royal, much recommended in all obstructions. It takes its name from glebo a, the Greek name of penny-royal, or pulgum.


Female, on a separate plant, Cal. Perianth like the male, but of five leaves. Cor. Petals five, long, acute, rather spreading. Nectaries two, short, like abortive filaments. Pfl. German superior, broad, compressed, longer than the corolla; style short, reflexed; stigma thick, the length of the flky, to which it is longitudinally affixed, down the upper part. Peric. Legume very large, broad, compressed quite flat, divided by numerous transverse partitions, and filled with pulp. Seeds solitary, roundish, hard, and pollinised.

At the summit, generally, of the male spike is an unit flowers, with four calyx-leaves and as many petals, with a nectary and flaments like the male, but with a pistil, producing perfect fruit, as in the female. Hence Linnaeus referred this genus to his class Polygania, but if it remains there
there it must rather be on account of the difference of structure in its male and female flowers, than for their flight, sexual anomalies. Even for this difference of structure we should rather place it in Daciea. See Sm. Introd. to Botany, 479, 485.

Obs. This genus has considerable affinity with Ceratonia, especially in the fruit. We cannot apply the term amomcnum to its inflorescence, which is a spike.


Female, Calyx of five leaves. Petals five. Nectaries two. Pillar one. Legume.

Some flowers united, four-clad.

The species of Gladiolus are as yet a mafs of confusion. G. tricantbus, Linn. Sp. Pl. 1599, the original one, a native of North America, was cultivated by bishop Compton in 1709, and is a tall handsome tree, which bears our climate well, except being sometimes broken, like Roebus Pseudo-acaciis, by strong winds. It is remarkable for its large trilobed or compound spines, which grow on the trunk, to the length of six or eight inches, from a very tender half. The leaves are deciduous, bipinnate, large, confounding of innumerable elliptical, slightly toothed, nearly smooth leaflets, half an inch or near an inch long. Flowers greenish, in axillary spikes. Some leaves appear to be simply pinnate, but we know not whether this is a specific difference or not.

A very distinct species is cultivated with us by the name of G. ethamii, which Linnaeus also had at Upsal, but he does not seem to have described it. The spines are compound. Leaves simply and abruptly pinnate, of seven or eight pair of thin, squarish, unequal-sized, crenate leaflets, gradually larger upwards, the terminal pair being sometimes twice the dimensions of the next.

In Sloth gardens, belonging to the duke of Northumberland, is a tree of another species, of which we find no mention. Its leaves are simply pinnate like the lily, and the leaflets also gradually larger upwards, but they are crenate, elliptical, their sides very seldom unequal. The calyx leaves and petals are narrow, shorter, and blunter than in G. trianctbus. Of its spines we have no account, but the leaves and flowers were communicated to us by Mr. Hoy, in August 1796, as a Gladiolus not in the Hortus Kewensis, where, indeed, all that are known are made varieties of the trianctbus. From the new edition of this valuable work perhaps more information may be expected.

G. incarnata, first mentioned by Linnaeus in the second edition of Sp. Pl. 1599, seems to have been adopted without a specimen, from Plunket's t. 123. f. 3, to which is added Miller's t. 5, which latter represents a Mimosa, nor does any subsequent writer appear to know any thing of this species.

It would be a tedious and unprofitable task to attempt a determination of the synonyms of this genus, even if the species were defined. The latter is a desirable object, and worthy the attention of those who have perpetual access to the old botanic gardens about London, and can observe these trees at different periods of growth. It is necessary to determine whether the simply or doubly pinnated leaves mark a specific distinction; whether the spines vary according to the species of the tree; and whether the legume is, in any species, constantlyinglee-feedcd, or merely from accidented abortion. Travellers in America can scarcely be expected to throw any light on such botanical questions as these, though a careful observer, resident there, might render highly important services to botany, and to the most useful arts of life, by determining first the specific differences, and then the economical qualities, of all the American trees, among which the Gladiolus claim a distinguished place. The labours of a Lambam among the Pines, and a Michaux among the Oaks, are models for future enquirers.

Gleditsia, in Gardening, comprehends a plant of the deciduous tree or shrub kind; of which the species usually cultivated is the three-thorned acacia (G. trianctbus), which seldom rises higher than a shrub in this country.

There are several varieties with different numbers of spines, and with stronger and weaker spines.

Method of Culture—These trees are capable of being increased by sowing the seeds, which are obtained fresh from America, in a bed of light earth, in the early spring season, watering them occasionally when the scaven is dry. It is, however, a much more expeditious practice to few them in pots, and plunge them in a moderate hot-bed. The plants should be kept clean during the first summer after they appear, and in the succeeding winter be well protected from severe frosts, especially such as are in pots.

The young plants may, most of them, in the following spring, be removed and set out in nursery rows, at a foot or eighteen inches distant from each other, and eight or ten inches in the row. Such small plants as remain, may be put out in the same manner in the next autumn or springing.

The plants should continue in this situation till they have had two or three years growth, after which they may be transplanted into the situations in which they are to remain any time towards the latter part of the spring season.

These plants are found to succeed well in situations where the soils are of the more light deep kinds, and rather sheltered from the incommode of the atmosphere.

They are all very ornamental trees, and well adapted to large shrubberies, plantations, and pleasure grounds. When planted alone, on lawns, and large open spaces that are kept in short grass, they produce a fine appearance. They have, however, the disadvantage of putting forth their leaves at rather a late period.

Gleditsia, or the Sycamore, is a musical term derived by Skinner, Junius, Johnson, and all the etymologists, from Gledis, Saxon, glee, mirth, sport.

His merry men commanded he
To make him both game and glee.

Chaucer, Rim. S.* Ta'p. v. 126.

The term, we believe, is not to be found in music-books, or musical writers, before the middle of the 15th century. The first time it appears in the title of a collection of canons, rounds, and catches, is in a publication by John Playford, 1667, under the title of "Dialogues, Glesse, Ayres, and Ballades, of two, three, and four Voices." A glee in music implies nothing more in its original sense, in our printed music-books, than "a song of three or more parts, upon a gay or merry subject, in which all the voices begin and end together, singing the same words." When subjects of fugue or imitation occur, and the composition is more artificial than simple counterpoint, it is only a glee than a madrigal, which it might, with more propriety, be called, if the words are serious: for a serious glee feems aolecinium, and a direct contradiction in terms. The word glee, in Saxon, German, and English dictionaries, ancient and modern, implying mirth, merriment, and in Chaucer and other old authors, mafic itself.

Gleeb, in Surgery, commonly signifies the continuation of a thin discharge from the urethra, after the inflammatory symptoms of a clap have for some time ceased. However, the running which takes place from the urethra in cases of frictures, diseased prostate gland, &c. is also frequently called a gleeb. A mere glee, unattended with any other disease of the parts, is not accompanied with the remarkable pain.
GLEET.

pain and falling sensation in making water, which are produced by gonorrhrea. The latter affection may be considered as acute, while the gleet is quite of a chronic nature. It was one of the opinions of Mr. Hunter, that a gleet differed from a gonorrhrea, likewise, in not being infectious. It is well known that it was one of the doctrines of this eminent surgeon, that the poison of gonorrhrea, and that which is productive of lues venerea, are of the same quality, and that the different effects are owing to the different structure of the parts concerned in the two diseases. We need not here enter into an investigation of this part of the subject. All that we wish to observe is, that if Mr. Hunter means, when he states, that a gleet differs from a gonorrhrea in not being infectious, that a gleet is not capabie of communicating the general disease, no one can question the accuracy of the observation. But, on the contrary, if the assertion implies that the matter of a gleet, when applied to the pudenda: muliebris, will not bring on a pain in making water, a discharge, &c. then we differ from the opinion altogether. We have known a instance, in which a gentleman, who had had a gleet upon him for upwards of a year, and who, on one occasion, was not infectious, ventured to have connection with a young woman, of whole continency, with regard to other men, we ourselves entertain no doubt. However, there may be gleets of various kinds, and some of them may be infectious, and others not so. When, after a gonorrhrea, a thin discharge continues, for a long while, to take place from the urethra, the complaint may depend upon a weakness of the vessels, or, as Mr. Hunter expresses it, upon a habit of action, which the parts have contracted. When a gleet arises from a friability in the passage, or from a diseased of the prostate gland, the caufe must be referred to irritation, and the cure depends on the removal of the original complaint.

Gleets, which are the consequence of gonorrhrea, are often exceedingly difficult of cure, and what is very curious, it frequently happens, that, after they have relapsed every 3 or 4 of remedy, and after the patient has long given up the use of medicines and injections, a sudden cure spontaneously occurs. Many gleets undergo a temporary floppage under particular circumstances of treatment; and, instead of recurring, regularly return again. A vast number of gleets depend upon the presence of a friability in the urethra, and of course are not curable by injections. We have often thought that in all cafes of gleets, it should be the invariable custom of the surgeon to introduce a bougie, for the purpose of ascertaining whether there is any obtrusion in the passage; for, when the discharge depends upon a friability, the patient might make use of balsams, turpentine, and bougies, for years, and yet receive no benefit whatever. At all events, whenever a gleet relapses ordinary means, the state of the urethra and of the prostate gland ought to be examined.

See Prostate Gland, Diseafe of; and Stricture.

Mr. Hunter was of opinion, that the spontaneous appearance of a gleet, after a long relapse to every sort of medicine and application, very frequently depended upon accidental changes in the patient's constitution. It was another sentiment of this celebrated surgeon, that some gleets were connected with fevers. This idea is founded on the circumstance, that more gleets may be cured by febrifugous than any other kind of bathing. It is also supported by the fact, of sea water being sometimes an effectual means of cure, when employed as an injection.

We have always found fault with this plan of judging of the nature of diseases. If a disorder yields to mercury, practitioners are apt to decide immediately, that the complaint is venereal. If a malady, like a gleet, gives way to sea bathing, which benefits scrofulous complaints, such surgeons, as reason on Mr. Hunter's principles, will immediately lay down the cause as scrofulous. It is never remembered in this calculation, that mercury cures many diseases besides the venereal; and so does sea bathing many complaints besides those which are of a venereal nature.

Gleets have also been represented as always connected with a relaxed constitution, though we think we have seen the complaint in subjects, who were strong, robust, and young, with every appearance of general health, and whose state seemed to us a striking exception to the foregoing observation.

Gleets, as we have before stated, are often exceedingly difficult of removal. Sometimes, indeed, they may be got rid of with tolerable ease; but in other instances, they completely frustrate the art of surgery, and the patient, tired of the inefficacy of different remedies, relinquishes the trial of all. In light cafes, and occasionally in inveterate ones, a cure may be effected by exhibiting internally the balm of copina, the olyum terrichlorin, or the tincture of lettuce (see page 231). In other cases, the cure can be accomplished by these means, benefit is soon derived from their employment. For this reason, when they neither diminish, nor remove the gleet in the course of five or six days, Mr. Hunter made it a rule never to continue their use any longer, but have recourse at once to other methods. We have already remarked the great tendency of many gleets to return, after being for a time flopped by different modes of treatment. Hence practitioners should never discontinue the successful plan immediately the discharge ceases, but persist in its adoption for ten days or a fortnight, after all the symptoms have entirely gone off.

In relaxed habits, gleets are very likely to be cured by the cold bath, sea bathing, bark, and febifugous medicines. Cold bathing indeed often succeeds in every kind of constitution, when other methods are of no avail. We have known strong young men labouring under gleets, who could not get rid of them in any way in London; but who got well almost immediately on going to the sea side, and bathing there. There can be no doubt also, that some beneficial resolution in the fever arising from the change of air, might have a considerable share in the cure. We lately had under our care a gentleman with a gleet, which had lasted nine months, but disappeared all at once on the patient going for a short time to a part of the country which was not near the sea.

There are two principal kinds of injections in use for the cure of gleets, viz. allringent and irritating ones.

The allringent ones are, for the most part, such as the decoction of bark, and mixtures of zincum vitriolatum, alum, or acetate of lead. An injection of proper strength, containing cuprum vitriolatum, bals gallicus, and camphor, is also an exceedingly efficacious one.

The bell irritating injection which we know of, is that made by dissolving two grains of the hydrargyrum muriaticus in eight ounces of distilled water.

Bougies may also be considered as acting on the urethra as irritating applications, and hence they are occasionally recommended to be used for the cure of gleets. In general, common bougies are employed; but sometimes others, medicated with camphor or other volatile substances, are used.

In irritable constitutions, the latter kind of injection and the bougies may excite a good deal of irritation, pain, inflammation, &c. &c. so that some circumspection is necessary in the employment of such means. We may state, indeed, that no undertaking should ever be made to cure a gleet, by exciting irritation in the urethra with irritating injections, or bougies, before milder means have failed. We have found a weak
weak injection of the hydrargyrum muriatius more frequently successful than any other. One grain to six ounces of water is quite strong enough to begin with, and the strength may be gradually augmented, in proportion as the urethra appears capable of bearing it. The practitioner must not leave off the injection as soon as the discharge ceases; for if he does so, the gleet will generally recur. The plan should still be followed up for about a fortnight.

When gleet are to be cured by bougies, it is necessary to wear these instruments about a month or six weeks before any dependence can be put in the permanence of the cure.

Neither the surgeon nor the patient should be deterred from pursuing the trial of irritating injections or bougies, by the circumstance of their appearing to increase the discharge at first. This they always do.

Mr. Hunter thought that moderation and regularity in diet were conducive to the cure of gleet. So is a quiet kind of life in the generality of cases, but there are instances in which gleet seen to be benefited and cured by rough exercise on horseback.

A return or an increase of a gleet is very apt to be the consequence of intercourse with women, and the patient often thinks that he has received a fresh infection. Mr. Hunter thought that the case might be discriminated by the short time which intervenes between the connection and the reappearance of the discharge. Gleet are so often exceedingly obdurate, that the surgeon cannot be informed of too many modes and principles of cure. On this account we deem it right to mention that gleet seem to be curable on the principle of counter-irritation. Hunter has seen a gleet stop on the breaking out of two chances on the penis, and the discharge has been known to stop as soon as a blister was applied to the under part of the penis.

Gleets have likewise been cured by electricity.

Women are liable to gleet, and the disease being situated in less irritable parts, whatever injections are used, may be made stronger for male patients.

It is almost unnecessary to remark, that blains and turpentine, internally given, can have no specific effect on the parts affected in women, as they have on the urethra in men. Hence it would be absurd to prescribe such medicines for female patients.

GLEITZBERG, or Glitzberg, in Geography, a town of Germany, in the principality of Nauff Weilburg; eight miles N.E. of Wetzlar.

GLEICHAN, a county of Germany, in the principality of Gotha, divided between the princes of Gotha, Hohenlohe, Hatzfeld, and Schwartzburg, situated on the banks of the Ohr, between Erfurt and Gotha.

GLEICHEN, Frederic von, in Biography, was born in the year 1714. He was intended and educated for the profession of arms, and spent the early part of his life as an officer in the service of Bayreuth, and was distinguished by his attention to military discipline. He rose to the rank of lieutenant-colonel, and obtained the favour of the margrave. His honours did not fit easily upon him, hefigured for retirement, and in 1756 his wives were accomplished; he obtained a dismission from the service with a handsome pension, to which was afterwards added the rank of privy councillor. He now had leisure to distinguish himself as a philosopher, a naturalist, and a writer. His attention was accidentally excited to microscopic observations, and not satisfied with the instruments already in existence he constructed an universal microscope, with which he combined the solar microscope. His principal observations relate to seminal animalcula, and infusion animals: he would fit day after day at his glafs, and was always displeased if he experienced any interruption while engaged in his favourite pursuit. By daily practice he had acquired uncommon acuteness of sight, which was of the greatest advantage to him in his researches. Though he had an ardent attachment to science for the love of it, yet he deviated various economical plans, from which he expected to derive great emolument, but they were the schemes of a theorist, and did not prove of real advantage either to himself or the world. He died in June 1783, leaving behind him numerous works in natural history, as "Observations on the Parts of Fructification in Plants in Bloom, and on the Insects found in them?" "History of the Common House Fly." "Treatise on Fumal Animalcula and Infusion Animals." "Essay towards the History of the Trees of the Elm:" this insect, the aphid alni campeltrix, coit our author the labour of eight years; it is the cause of the bladders on the leaves of the elm-tree during the foring. Gen. Biog.

GLEICHENBERG, in Geography, a town of the duchy of Sireia; 10 miles N. of Racketburg.

GLEICHENBERGAN, or Gleich Berg, a town of Germany, in the county of Henneberg; four miles E. of Romhold.

GLEICHENIA, in Botany, named by the writer of this article in honour of Philip Frederick, Baron von Gleichan, author of a splendid microscopic work on the structure and physiology of the parts of fructification in several plants, published at Nuremberg, in folio, with coloured plates, in 1764. As the seeds of ferns were among the subjects to which Baron Gleichan paid great attention, a genus belonging to this curious tribe was judged peculiarly proper to commemorate him. Smith in Mem. de l'Acad. de Turin, 1785. 419. t. 9. f. 10. Tractis, 258. t. 1. f. 10. Swartz. Fil. 165. Brown. Prod. v. 1. 160. (Mertensia; Willden. in Act. Holm. ann. 1804. 165. t. 4. 5. Swartz. Fil. 163.)—Chas. and order, Cryptogamia Filices et. Annullae. Nat. Ord. Filices daffferae.

Eff. Ch. Capsules in a simple, concentric, orbicular feries; each feries constituting a round separate dot, on the back of the leaf. Cover none.

This genus was first founded on the Onoclea papyrioides of Linnaeus, an elegant and singular fern, native of the Cape of Good Hope. In this the capsules are usually three, rarely four together, half imbedded in the under side of the frond, and as each burr by a longitudinal fissure, they all together have exactly the appearance of a single capsule, of three cells, and three valves, the partitions seeming to originate from the centre of each valve. Traces of a joined ring appear on some of the valves only, and rather resemble the corrugations of those ferns termed "punctiforty annulated." Several other species, chiefly allied to the original one in habit and appearance, so as to be at first sight scarcely distinguishable from it, have been found in New Holland, and have been defined by Dr. Swartz and Mr. Brown. In these the capsules are not imbedded in the leaf, though each feries ends in a single depression. In G. dispersa of Brown there are only two together; in others three, four, or even five. These new discovered species evidence the propriety of Mr. Brown's measure, of reducing the Mertensia of Willdenow and Swartz to Gleichenia, as their fructifications exactly agree. Dicranopteris of Bernhardi does not in our opinion to well accord with them, having an irregular accumulation of stalked capsules in each dot, though its habit is precisely that of Mertensia. Mr. Brown, having examined these ferns alive, determines them to be furnished with a complete, flattened, transfervic, rarely oblique, ring.

This
The genus naturally divides itself into two sections. The original *Glechonum*, of which there are five species, have the ultimate branches of their repeatedly forked form pinnate, their leaflets or *pinnae* deeply pinnatifid, with short, triangular, or rounded segments, each segment bearing a single dot or series of capules. The *Menyanthes* have their ultimate branches deeply pinnatifid, the segments linear, with a row of numerous dots on each side of the midrib of each segment, especially at its lower half. Of these we are acquainted with five or six species, all natives of the East or West Indies, or of New Holland and its neighbourhood.

**Gleichenstein**, in Geography, a town and castle of Germany, in the territory of Eichsfeld; seven miles S.E. of Heiligenstadt.

**Gleinstollen**, a town of the duchy of Stiria; 14 miles S.E. of Voitsberg.

**Gleiss**, a town of Switzerland, in the Valais; 26 miles E. of Sion.

**Gleiwitz**, or **Gleiwitz**, a town of Silesia, in the principality of Oppeln; 20 miles N. E. of Ratibon. N. lat. 52° 17'. E. long. 18° 35'.

**Glen River**, is a river of Lincolnshire, which rises near Ropley, and pursues a course nearly S.S.E. to Braceborough, when, turning suddenly N. E., it passes to Kate's bridge and through the Fens, by Surfleet, to the sea at Fosdyke Wash; for the greater part of its course through the Fens this river is navigable for barges, a circumstance which was overlooked in compiling the alphabetical list of inland navigations in our article CANAL.

The small river or drain called the Bourne, which branches from the Glen and proceeds up to Bourne town, is also navigable for some distance upwards. The South Forty-foot navigable drain commences very near to this river, below the mouth of the Bourne, and proceeds by a circuitous route to Bolton. See South Forty-foot.

**Glenaa**, a mountain in the county of Kerry, Ireland.

**See Killarney**

**Glenan Islands**, a cluster of small islands in the Atlantic, near the coast of France. N. lat. 47° 43'. W. long. 3° 55'.

**Glenarm**, a poth town of the county of Antrim, Ireland, on the coast of it, adjoining which is Glenarm castle, the seat of the countes of Antrim. The town is pleasantly situated on the sea-shore, near the bay of the same name. It is 104 miles N. from Dublin, and 24 N. from Belfast.

**Glenavy**, a poth-town of the county of Antrim, Ireland, situated near the eastern border of Lough Neagh. It is 77 miles N. from Dublin on the road to Antrim.

**Glencoe**, a vale of Scotland, in the county of Argyyle, near Loch Leven, where, in the year 1691, the inhabitants were massacred contrary to the faith of a royal proclamation, 17 miles N. of Inveraray.

**Glenalough, Glennalought**, or **Glenaladach**, commonly called the Seven Churches, an interloping object to travellers in the county of Wicklow, Ireland, 22 miles S. from Dublin, and about seven or eight miles west from Rathdrum. Its name is derived, according to Mr. Ledwich, from its being situated in a valley with lakes, from *glen*, a valley, and *leab*, a lake. That this was the true origin of the name seems to be confirmed by Hoveden, who was chaplain to Henry II., and who calls it equivalently in Latin, *Episcopatus Birtagnensis*, the bishopric of the two lakes. Glenalough is surrounded on all sides, except to the east, by stupendous mountains, whose vall perpendicular height throws a gloom on the vale below, well suited to inspire religious dread. From these, many mountain-
other, confines the view up the river to the valley; at the end of which the great round tower, and the other ruins, appear to great advantage. As the new military road has made Glendalough easily accessible, it is frequently visited by travellers. Ledwich's Antiquities.

GLENE, 2, properly signifies the cavity or socket of the eye.

GLENE is more frequently used by anatomists for the shallow cavities of bones, into which some other bone is received and articulated.

By which it stands distinguished from 

GLENEGAD HEMP, in Geography, a cape of Ireland, in the peninsula of Inis Lwenum, county of Donegal. W. long. 7° 41' from Greenwich, N. lat. 55° 20'.

GLENGARRIFF, a harbour of Ireland, in the county of Cork, on the north-east part of Bantry-bay. The arbutus grows in this neighbourhood in great perfection.

GLENGARY, the name of a county in Upper Canada, bounded on the E. by the line which separates Upper from Lower Canada; on the S. by the river St. Lawrence; and on the W. by the township of Cornwall, running N. 42° W., until it intersects the Ottawa or Grand river, thence defending the said river till it meets the fore-mentioned separating line. Glengary county comprehends all the islands contiguous to it in the river St. Lawrence.

GLENCIZA, a river of the duchy of Warsaw, which runs into the Odra, near Koblen.

GLEKEN'S CANAL, the parliamentary name of an inland navigation, made since the year 1802, in Kirkcudbright county in Scotland. See CANAL.

GLENLUCE, a town of Scotland, in the county of Wigtown, which sprang from an abbey of Cistercians, founded in 1140, called "Vallis Lucis." It is situated at the northern extremity of a large bay to which it gives name; 18 miles W. of Wigtown. N. lat. 54° 58'. W. long. 4° 27'. The bay extends on the S. coast of Scotland from the Mull of Galloway to Burrowhead. N. lat. 54° 50'. W. long. 4° 50'.

GLENMORE, a small island on the W. coast of Scotland, at the mouth of Loch Snart. N. lat. 56° 38'.

GLENOID, in Anatomy, from γλωυς, the articular cavity of a bone, and όδος, form, a term applied to certain articular surfaces, particularly where the hollow is not deep.

GLERS, in Geography, a town of Germany, in the county of Tyrol; 21 miles W. of Bolzano.

GLESE, a river of Louisiana, which runs into the Mississippi, N. lat. 32° 15'. W. long. 90° 14'.

GLESUM, or GLESEM, in Natural History, a name given by many of the ancients to the common yellow amber or succinum. The word seems to have been originally German, and to have been adopted by the Romans in their conquests in that part of the world. They seem to have used the word in general for any transparent substance, and thence to have applied it to amber as a transparent stone. See GLASS.

GLETSCHERHORN, in Geography. See JUNGFRAU.

GLIANY, a town of Poland, in Galicia; 20 miles E. of Lemberg.

GLIANA, a town of Sweden, in Vell Bothnia; 25 miles W. N. W. of Tornoa.

GLIGVI, a town of Alia, in Dageltan; 90 miles N. of Trjeby.

GLIKEON, a town of European Turkey, in the province of Epyr; 26 miles W. of Artua.

GLIMES HOLT, one of the small Orkney islands, which affords pastures; 2 miles S. of Pomona, between that and Barry.

GLIMMER, or CAT-SILVER, in Mineralogy, according to Dr. Woodward, "Method of Fossils," p. 14, are names for Mica, which fce. Glith, splangles, daze, and silver, are other names by which the miners and quarrymen designate the flaking plates of this substance which they meet with dispersed in the earths and stones in their works. The late Mr. William Martin observes, "Outlines," p. 141, "Glimmer is frequently dispersed through the sand-stones and clay, forming vegetable petrifactions, but never constricts their whole flakiness." In Derbyshire, it is not uncommon to find nodules, or round mélts or mæiffs of mica, in thin and separate plates, in the firld, or millilomays grit, which fall out on exposure, and leave 'peric' holes, a circumstance which has, according to Mr. Farey, given rise to rock-basins or holes on the tops of large looke blocks of flake where the water flakes in many instances after rain, but not perpetually, as the vulgar opinion is. See ROCK-BASINS.

GLINA, in Geography, a river of Croatia, which runs into the Sava; 12 miles W. of Patrini.

GLINLOUGH, a lake of Ireland, in the northern part of the county of Leitrim, from which a small river flows to Sligo bay.

GLINNINO, a town of Ruflia, in the government of Novogorod, on the Mita; 12 miles S. E. of Borovitchi.

GLINSK, a town of Ruflia, in the government of Tchernigof, on the river Sula; 80 miles S. E. of Tchernigof.

GLINUS, in Botany, derives its name from γλυκός; or γλώγος, a word used by Theophrastus, and denoting a kind of maple, though we cannot trace any similitude between that tree and the little herbaceous plant, by which the name was applied by Loefling; but it was adopted by Linnaeus.


Gen. Ch. Cal. Periakus inferior, of five ovate, acute, concave leaves, coloured within, permanent, and downy. Cor. none; nectaries about five, resembling narrow petals, shorter than the calyx, and unequally two or three-cleft. Stam. Filaments about fifteen, awd-shaped, flat, as long as the calyx; anthers incumbent, oblong, comprefsed, two-lobed. Pyl. German of five fide; styles five, short; figmas simple. Peric. Capsule ovate, with five cells, five sides, and five valves. Seeds numerous, roundish, in a single row at the base of the valves, tubercled, each attached by a long thread-like flak.


1. G. lotoides. Linn. Sp. Pl. 663. Burm. Ind. 112. t. 36. f. 1. "Stem hairy. Leaves obovate." — Native of Spain, and found by Loweling in a gravelly soil near Talavera de Badajoz, also in a dried-up rivulet between Merida and Truxillo. Root annual. Stems procumbent, jointed, hairy. Leaves obovate, on foot-stalks. Flowers nearly in fide; crowded together, found virile on very short hairy flaks. A figure of this species is defined to appear in the Flora Grecia, t. 472, from a drawing made at Smyrna, and from which it appears that what Gartner considered as petals, are more probably nectaries, as not being external to the stamens; after all, they ought perhaps to be called

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barren filaments. They seem, from the dried specimen, to be ranged alternately with the real lamins.

2. G. distichus, Willh. Sp. Pl. v. 2. 929. Pluk. Amal. 10. 1. 356. f. 6.—"Leaves round, hairy. Stem thrubby, proliferate. Leaflets of the calyx lanceolate."—Native of India. It feems dothful whether G. distichus be not merely a variety of lotsides; but as Willdenow fill keeps them separate, on the authority of a dried specimen, we have retained the species.

3. G. fitzefem. Willh. Sp. Pl. v. 2. 929. Vahl. Synb. 3. 64.—"Leaves obovate, plaited. Stem thrubby. Leaflets of the calyx ovate."—Native of inundated woods in Arabia Felix during the rainy season. The whole plant is hoary, from very thick hairs, which are longer than in G. lotsides. This species was first described by Vahl, from Forskål's specimen which we have examin'd. The puberulence is beautifully flabillated and very dense.

GLINUS, in Leechology, a name by which Bellomus and some other authors have call'd a small sea-fish, more commonly known by the name of the sacrumculus.

GLIS. In the common acception of the word, this only signifies the dormouse; but Linnaeus has used /gles in a larger sense: and, in the Systema Zoologiae, makes it the name of the fourth order of the mammallians, class of animals. The creatures of the class are, that they have only two fore-teeth in each jaw; they have no dentes canis, or dog-teeth, and the feet have toes, and are formed for leaping when they run. The animals of this class are the several species of the Hybri, Cavia, Cailor, Mus, Arctomys, Steuris, Myoxus, Dipus, Lepus, and Hyrax; which see respectively.

GLIS, a name given to several species of Myoxus; of Didelphis; of Mus; and of Arctomys; which see respectively.

GLIS Volum. See Vespertilo Spalma.

GLISCHROMICTHES, in Natural History, the name of a genus of compound earths. The word is derived from glis, touch, and -chromia, mixed. The bodies of this genus are loams composed of sand and a more vitrific clay, and are of a tough and firm texture.

The earths of this genus are used in making bricks, and on some other occasions; and are of several distinct species.

GLISSA, in Ophthalmology, the name of a sea-fish of the tunny kind, but of a perfectly smooth skin, and wholly free from scales. It usually grows to the length of two cubits, and the thickness of a man's body: it is of a very round body, and has very rough jaws, but no distinct teeth; its tail is forked, but not so arched or lunate as that of the tunny; it lives in deep water, and is a fish of very delicate taste. Gafner. De Pisc. p. 1158.

GLISSON, FRANCIS, in Biography, was born at Ramphall, in Dorsetshire, in the year 1591, and educated at Caen college, Cambridge, of which he became a fellow, and in 1627 was incorporated M.A. in Oxford. He then applied himself to the study of physic, in which faculty he took his degree of doctor at Cambridge, and in that university was made regius professor of physic, which office he held about 40 years. He settled in London for the practice of his profession, and was admitted a fellow of the College of Physicians in 1635. In 1639 he was chosen reader of anatomy in the college, and in that department acquired great reputation by his lectures "De Morbis Partium," which he was particularly requested by his colleagues to make public. During the civil wars he retired to Coleheffer, where he practised with great credit in those times of confusion, and was in the town at its memorable forge by the parliamentary forces in 1648. He was one of that small, but illustrious society, who instituted a weekly meeting in London about the year 1645, for the purpose of promoting inquiries into natural and experimental philosophy, which, after having removed to Oxford during the troubles, was augmented in London after the restoration, and became ultimately the Royal Society. He was afterwards several years president of the College of Physicians, and died in 1677, in the parish of St. Bride's, London, aged 80. Glisson left the following works: 1. "Tractatus de Rachitide, seu morbo puerili Rickets dicto," first published in 1650; it went through several editions abroad, and two translations into English the year after its publication, by Philip Armin, and Nicholas Culpepper. 2. "Anatomie Hepatis, &c." London, 1644; afterwards reprinted at Amsterdam and the Hague. This work contains a much more exact description of the liver than had before appeared. The capsule of the /vea portarum was supposed to be first discovered by him, and he has ever since borne his name; but Wallis and Pecquet had seen it a short time before, and he has only the merit of having first examined and described it with accuracy. Dr. Glisson's largest work is a metaphysical piece, viz. "Tractatus de Natura Substantia Energetica, feu de Vita Naturae, ejusque tribus primis Facultatibus," Lond. 1672, in 4to., a profound and laborious performance, in the very depth of the Aristotelian philosophy, with all its numerous divisions, and an extraordinary effort of the understanding in a man of an advanced age.—1. His last publication, "Tractatus de Ventriculo et Intellinii, cui praemittitur alius de partibus continentibus in genere, et in specie, de eius Abdominis," Lond. 1676, 4to., Amst. 1677, 12mo., contains every thing at that time known concerning the alimentary canal, arranged in a clear manner, with various new observations. In a word, Glisson was exceeded in judgment and accuracy by none of that group of English anatomists, who followed the steps of Harvey with great arbour and industry; infomuch that Boerhave terms him "omium anatomicorum excellissimum," and Haller speaks in prose of all his writings. Akin Bied. Mem. of Med. Ely. Diot. Hist.

GLISTER. See CLUSTER.

GLITNESS, in Geography, one of the smaller Shetland islands, on the E. coast of Shetland; 11 miles N. of Lerwick. N. lat. 62° 22'. W. long. 1° 16'.

GLIUBEN, a town of European Turkey, in Dalmatia; 18 miles S.E. of Mollax.

GLIZEADE, in Fencing, is an operation performed by dextrously making your blade slip along that of your adversary by a movement of the wrist, and a quick forward extension of the arm, without deviating from the line of direction. This is a simple, and at the same time a most easy movement in fencing.

GLIODE, in Botany, a Malay name adopted by Rumplins and Linnaeus, under which, however, they have included a very heterogeneous assemblage of species. We shall speak only of such as agree in generic character with the original one, seen and described by Linnaeus, and preferred in his herbarium. Linn. Nat. 2. 142. Schreb. 25. Willd. Sp. Pl. v. 1. 153. Mart. Mill. Dict. v. 2. Rolfe in Tr. of Linn. Soc. v. 8. 355. t. 1. 20. f. 1. 3. Hort. Kew. ed. 2. v. 1. 9. Jiff. 63. Lamarck Dict. v. 2. 729.—Cladis and order, Monandria Monogyyna. Nat. Ord. Schimae, Linn. Cana, Jiff.

Gen. Ch. Col. Perianth superior, of one leaf, tubular, permanent; its border three-lobed. Cor. of one petal; tube long, cylindrical, slender; outer limb in three, nearly equal, ovate, spreading lobes; inner of two similar lobes, and a central,
central, vertical, prominent lip, cloven at each extremity. Stam. Filament one, prominent, long, linear, channelled, dilated at its summit; anther oblong, of two distinct parallel lobes, attached by its back to the dilated part of the filament. Pist. Germen inferior, roundish; style thread-shaped, the length of the filament and embraced by it; stigma obtuse. Pet. Capsule roundish, of three cells and three valves. Seeds numerous.

Eff. Ch. Anther in two parts. Filament elongated, incurved, bearing a lobed appendage. Style thread-shaped, embraced by the anther. Corolla with three outer lobes and three inner, the middlemost vertical and cloven.

1. G. marantina. Linn. Mant. 2. 170. Sm. Exot. Bot. v. 2. 85, t. 103. (Colebrookia bulbifera; Donn Cant. 1.)—Appendage of the filament four-lobed, divaricated, terminal. Spike not taller than the leaves. Bracteas elliptical, broad, longer than the calyx.—Native of Bengal, from whence it was sent by Dr. Roxburgh to the late lady Amelia Hume in 1800. It flowers in the flave in July and August. Root perennial, tuberous. Stems several, herbaceous, about two feet high, simple, leafy. Leaves elliptical, acute, entire, with one rib and numerous parallel fimple veins; smooth above; soft and finely downy beneath; their footstalks long, sheathing, bearded at the top, which is extended upwards into a pair of rounded auricles. Spike terminal, solitary, fimple, erect, more or less lax, about as tall as the leaves, or rather under that height. Bracteas alternate, fesse, elliptical, broad, concave, many-ribbed, somewhat downy, minutely dotted; the lower ones each bearing one ovate bulb; the upper ones a cluster of several flowers, each of which is accompanied by its own smaller bractea. These flowers are very transient, fimbried, orange-coloured, with a deeper spot in the centre of the lip.

2. G. racemosa. Sm. Exot. Bot. v. 2. 115, t. 117. (Deodara; of the inhabitants of Nepal.)—Appendage of the filament arrow-shaped, narrower than the anther. Callus elongated, cylindrical. Bracteas shorter than the calyx, deciduous.—Gathered by Dr. F. Buchanan in the woods of Upper Nepal, flowering in June. Habit of the leaf, but taller, with larger more pointed leaves. The inflorescence is much more striking, and consists of a long terminal raceme of numerous orange-coloured flowers, which are twice the size of the former, and essentially distinguished from that by the arrow-shaped form of the appendage to their filament, which does not extend beyond the anther, except at its rounded termination.

3. G. vericolor. Sm. Exot. Bot. v. 2. 116, t. 117, a, b, c. (Hura Siamenium; Kenig in Retz. Obf. f. 3. 49.)—Appendage of the filament four-lobed, divaricated. Calyx somewhat corymbose. Bracteas shorter than the calyx. Lip towards the middle of the filament.—Found by Kenig plentifully in graily shady parts of the island called Young Ceylon, in the East Indies. The clughs of flowers is shorter and more corymbose than in G. racemosa, and the corolla is variegated with orange, white, and different shades of violet. The appendage of the filament nearly resembles that of G. marantina, but the situation of the lip, thurf, as it were, half way up the filament, above the other lobes of the corolla, is altogether peculiar. For this, however, we depend on a drawing made by Mr. Sidney Parkinson, and communicated by Sir Joseph Banks, of the accuracy of which we have no reason to doubt. Kenig mentions a more dwarf variety, found near the town of Malacca. Can this be what has lately been introduced into the flaves about London by Dr. Roxburgh, and which we have seen and examined at Sir Abraham Hume's, and at Meffra. Lee and Kennedy's, flowering in June 1810? It is figured in Curtis's Magazine, t. 1359, where Dr. Sims has, we think, justly made this pretty plant a new genus by the name of Manduca foliariia. It differs from Globia in having a radical, not terminal, inflorescence, which, as far as we know, is an infallible indication of a generic difference in this natural order, and therefore the flower affords, as was necessarily to be expected, clear essential characters of distinction, in the two long linear appendages to the lower part of the filamento, which supply the place of two of the inner segments of the corolla, while the lip, which makes the third, is not fimbri at its upper extremity. The large purple bracteas, and the branched flower-stalk, are also remarkable. S.

GLOBE, in Geometry, a round or spherical body, more usually called a sphere; which term.

The earth and water together are supposed to form a globe; hence called the terrestris globe.

The planets, both primary and secondary, are supposed, as well as our earth, to be solid globes.

The earth is, in a particular sense, called the globe, or globe of earth; though it is now well known that this is not its true figure. See Figure of the Earth.

GLOBE, Refllexion of a. See Resistance.

Globe is more particularly used for an artificial sphere of metal, platter, paper, or some other matter; on whose convex surface is drawn a map, or representation, either of the earth or heavens, with the several circles conceived thereon.

Gloves are of two kinds, terrestrial and celestial: each of very considerable use, the one in astronomy, and the other in geography, to perform many of the operations thereof in an easy, feasible manner, so as to be conceived without any knowledge of the mathematical grounds of those arts.

The fundamental parts, common to both globes, are an axis, representing that of the world, and a spherical shell or cover, which makes the body of the globe, on whose external surface the representation is drawn.

Gloves, we have observed, are made of divers materials, viz. silver, brass, paper, platter, &c. Those commonly used are of platter and paper; the construction whereof is as follows.

Globes, Construction of. A wooden axis is provided, somewhat less than the intended diameter of the globe; and into the extremes hereof two iron wires are driven for poles: this axis is to be the beam or baits of the whole structure.

On the axis are applied two spherical, or rather hemispherical caps, formed on a kind of wooden mould or block. These caps consist of pulpboard and paper, laid, one lay after another, on the mould, to the thickness of a crown piece; after which, having fixed to dry and embody, making an inclion along the middle, the two caps, thus parted, are flapped off the mould.

They remain now to be applied on the poles of the axis, as before they were on those of the mould; and to fix them in their new place, the two edges are fown together with packthread, &c.

The rudiments of the globe thus laid, they proceed to strengthen and make it smooth and regular. In order to this, the two poles are halped in a metaline semi-circle of the size intended: and a kind of platter, made of whiting, water, and glue, heated, melted, and incorporated together, is daubed all over the paper surface. In proportion as the platter is applied, the ball is turned round in the semicircle, the edge whereof pares off whatever is superfluous, and beyond the due dimension, leaving the rest adhering in places that are short of it.

After such application of platter, the ball stands to dry; which done, it is put again in the semi-circle, and fresh matter
GLOBE.

matter applied: thus they continue alternately to apply the composition, and dry it, till such time as the ball everywhere accurately touches the semi-circle; in which state it is perfectly smooth, regular, firm, &c.

The ball thus finished, it remains to paste the map or description thereon: in order to this, the map is projected in several gores or gulfs, all of which join accurately on the spherical surface, and together cover the whole ball. To direct the application of these gores, lines are drawn by a semi-circle on the surface of the ball, dividing it into a number of equal parts corresponding to those of the gores, and subdividing those again answerably to the lines and divisions of the gores.

The papers thus pasted on, there remains nothing but to colour and illuminate the globe, and to varnish it, the better to retain dull, moisture, &c.

The globe itself thus finished, they hang it in a brass meridian, with an hour circle and quadrant of altitude, and thus fit it into a wooden horizon.

Globes, Description of. The things common to both globes are either delineated on the surface, or added as appendages without it. Without the surface are, 1. The two poles whereon the globe is turned, representing those of the world. (See Pole.) 2. The brass meridian, which is divided into degrees, and parallels through the poles. 3. The wooden horizon, whose upper side represents the horizon, and is divided into several circles; the meridian whereof contains the twelve signs of the zodiac, subdivided into their degrees; the next the Julian; and the third the Gregorian calendar, without sides of all these, are drawn the points of the winds. 4. A brass quadrant of altitude, divided into 90 degrees, to be fastened on the meridian at the distance of 90 degrees from the horizon. 5. The hour-circles, divided into twelve hours, and fitted on the meridian, round the poles, which carry an index pointing to the hour. A mariner's compas is sometimes added on the bottom of the frame, and sometimes a semi-circle of position.

On the surface are delineated, 1. The equinoctial line, divided into 360 degrees, commencing from the vernal interfection. 2. The ecliptic, divided into twelve signs, and the zodiac subdivided into degrees. 3. The zodiac. 4. The two tropics. And, 5. The polar circles. All which fee under their proper articles.

What else belongs to globes, either as to construction or description, is different as the globe is either celestial or terrestrial.

Our common globes, though instructive instruments for explaining the first rudiments of geography and the spherical doctrine of astronomy, yet labour under several defects: as they do not shew how the phenomena, illustrated by them, arise from the motion of the earth, which is the principal thing beginners especially should have in view, and as they are only formed for the present age, and do not serve the purposes of chronology and history, which they might be made to do, if the poles, wherein they turn, were contrived to move in a circle round those of the ecliptic, according to its present obliquity.

Mr. John Senex, F. R. S., invented a contrivance for remedying these defects, by fixing the poles of the diurnal motion to two shoulders or arms of brass, at the distance of 23° 27' from the poles of the ecliptic. These shoulders are strongly fastened at the other end to an iron axis, which passes through the poles of the ecliptic, and is made to move round with a very slight motion; so that when it is adjusted to any point of the ecliptic, which the equator is made to intercept, the diurnal motion of the globe on its axis will not be able to disturb it. When it is to be adjusted for any time, past or future, one of the brass shoulders is brought under the meridian, and held fast to it with one hand, whilst the globe is turned about with the other, so that the point of the ecliptic, with which the equator is to intercept, may pass under 0 degree of the brass meridian: then holding a pencil to that point, and turning the globe about, it will describe the equator according to its position at the time required; and transferring the pencil to 23° 27', and 66° 33' on the brass meridian, the tropics and polar circles will be so described for the same time. By this contrivance, the celestial globe may be so adjusted, as to exhibit not only the rulings and settings of the stars, in all ages and in all latitudes, but likewise the other phenomena that depend upon the motion of the diurnal axis round the annual axis. Senex's celestial globes, especially the two greatest, of fourteen and twenty-eight inches in diameter, have been constructed on this principle: for that by means of a nut and screw, the pole of the equator is made to revolve about the pole of the ecliptic. Phil. Trans. N. S. 447. p. 201. 202. Or Martyn's Abr. vol. viii. p. 217, and N. 494. art. 18. in Phil. Trans. vol. lib. p. 396. Mr. Joseph Harris, late Surveyor of the mint, contrived to remedy the former of the defects above-mentioned, by placing two horary circles under the meridian, one at each pole; these circles are fixed tight between two brass collars placed about the axis, so that when the globe is turned, they are carried round with it, the meridian serving as an index to cut the horary divisions. The globe, in this state, serves readily for solving problems in north and south latitudes, and also in places near the equator; whereas, in the common construction, the axis and horary circle prevent the brass meridian from being moveable quite round in the horizon.

This globe is also adapted for shewing how the vicissitudes of day and night, and the alteration of their lengths, are really occasioned by the motion of the earth; for this purpose, he divides the brass meridian, at one of the poles, into months and days, according to the sun's declination, reckoning from the pole. Therefore, by bringing the day of the month to the horizon, and rectifying the globe according to the time of the day, the horizon will represent the circle separating light and darkness, and the upper half of the globe the illuminated hemisphere, the sun being in the zenith.

Mr. Harris also gives an account of a cheap machine for shewing how the annual motion of the earth in its orbit causes the change of the sun's declination, without the great expense of an orrery. Phil. Trans. N. S. 466. p. 321. &c. or Martyn's Abr. vol. viii. p. 352.

The late Mr. George Adams, mathematical instrument maker to his majesty, has made some useful improvements in the construction of the globes. His globes, like others, are suspended at their poles in a strong brass circle, and turn therein upon two iron pins, which are the axis. They have besides a thin brass semi-circle, moveable about the poles, with a small, thin, sliding circle upon it. On the terrestrial globe, the thin brass semi-circle is a moveable meridian, and its small sliding circle the visible horizon of any particular place to which it is set. On the celestial globe, the semi-circle is a moveable circle of declination, and its small annexed circle an artificial sun or planet. Each globe hath a brass wire circle, placed at the limits of the twilight, which, together with the globe, is set in a wooden frame, supported by a neat pillar and claw, with a magnetic needle at its base. On the terrestrial globe the division of the earth into land and water is laid down from the latest discoveries; there are also many additional circles, as well as the rhumbs-lines, for solving all the necessary geographical and nautical
nautical problems. On the celestial globe, all the southern constellations, lately observed at the Cape of Good Hope by M. de la Caille, and all the stars in Mr. Flamsteed's British Catalogue, are accurately laid down and marked with Greek and Roman letters of reference, in imitation of Bayer. Upon each side of the ecliptic are drawn eight parallel circles, at the distance of one degree from each other, including the zodiac; and these are crossed at right angles with segments of great circles at every fifth degree of the ecliptic, for the more readily noting the place of the moon, or of any planet upon the globe. The author has also inferred, from Ulugh Begh, printed at Oxford in 1665, the mansions of the Moon of the Arabian Astronomers, so called, because they observed the moon to be in or near one of these every night during her monthly course round the earth, to each of which the Arabian characters are fixed. On the strong brazen circle of the terrestrial globe, and about 23½ on each side of the north pole, the days of each month are laid down according to the sun's declination; and this brafs circle is so contrived, that the globe may be placed with the north and south poles in the plane of the horizon, and with the south pole elevated above it. The equator, on the surface of either globe, serves the purpose of the horary circle, by means of a semicircular wire placed in the plane of the equator, carrying two indices, one of which is occasionally to be used to point out the time. For a farther account of these globes, with the method of using them, the reader may consult Adams's Treatise on their Construction and Use, &c. 1769.

Globe, terrestrial, is a spherical figure, on whose convex surface the fixed stars are laid down, at proportionable distances, together with the principal circles of the sphere.

The surface of the celestial globe may be esteemed a just representation of the concave expanse of the heavens, notwithstanding its convexity; for if the eye were placed in the centre of it, and the globe made of glass, the stars that are drawn upon it would appear in a concave surface, exactly corresponding to those in the heavens. The use of these globes is to exhibit the phenomena of the motions of the sun and stars, in an easy and obvious manner; which, though somewhat inaccurate, is yet exact enough for the common uses of life, and may save the trouble of trigonometrical calculations.

To exhibit the stars, circles, &c., on the surface of a given sphere or ball, and fit for the use of astronomy—1. Assume any two points diametrically opposite to each other, as P and Q (Plate XIV. Astronomy, fig. 117.) and in these fix up axes, PA and QC, for the ball to turn round on. The points P and Q, or A and C, will exhibit the poles of the world.

2. Divide a brazen circle A B C D into four quadrants, A E, E C, C F, and F D; and subdivide each quadrant into 90 degrees, numbered from the points E and F, towards the poles A and C.

3. Inclose the globe in this circle, as in a meridian, at the points A and C, so as it may freely turn therein.

4. Apply a style or pin to the surface of the globe, in the first degree of the meridian, and turn the ball round; by this means will a circle be described on the surface, representing the equator to be divided into degrees.

5. From the pole of the world P towards M, and from the other pole C towards N, number 23½ degrees; the points M and N will be the poles of the ecliptic.

6. Apply a style to the meridian, in the point M, and turn the globe round; by this rotation will the arctic polar circle be described; and after the same manner is the antarctic polar to be described about the point N.

7. Number 23½ deg. from the equator towards the poles P and Q, and note the points H and I; then applying a style to the meridian, as before, two circles will be described parallel to the equator, whereof that drawn through H will be the tropic of Cancer, and the other through I the tropic of Capricorn.

8. Hang the globe within the meridian, in the poles of the ecliptic, as before in the poles of the world; and applying a style to E, turn it round: by this means will the ecliptic be delineated, which remains to be divided into twelve signs; and each of these, again, divided into thirty degrees.

9. While the globe remains thus suspended, bring the degree of longitude of any star under the meridian; and in the meridian, number as many degrees towards the pole as is the degree of latitude of the place; the point of intersecion is the place of that star on the surface of the globe. After the like manner may the place of the star be determined from the right ascension and declination given, the globe being supposed suspended from the poles of the world, or of the equator.

10. All the stars of a constellation thus laid down, the figure of the constellation is to be designed; after which it may either be coloured or engraven.

11. Place the globe with the meridian, in a wooden frame or horizon, D B L., supported on four feet, in such manner as to be divided thereby into two hemispheres, and that the pole A may be raised or depressed at pleasure.

12. On the limb or edge of the horizon describe a circle, which divide into 360 degrees, and infer the calendars and winds.

13. Lastly, To the pole A fit a brazen circle, divided into twenty-four horary parts, and numbered twelve, so that the line of division of XII. may be in the plane of the meridian, on either side the pole; and on the pole itself apply an index, to turn round with the globe. See Horary Circles. This is the globe complete.

It may be here observed, that as the longitude of the stars is continually increasing, a common globe does not remain of perpetual use; but the increase in seventy-two years only amounting to a degree, the globe will make no considerable error in a hundred years; the design of a globe being only to represent things something near the truth.

Globe, to make a celestial. This method is that most frequently used; and we only premised the former as being the most clearly conceived, and leading more naturally to this.

1. From the given diameter of the globe, find a right line A B, fig. 118, equal to the circumference of a great circle, and divide it into twelve equal parts.

2. Through the several points of division, 1, 2, 3, 4, &c., with the interval of ten of them, describe arches, mutually intersecting each other in D and E: these figures or planes, duly pained or joined together, will make the whole surface of the globe.

3. Divide each part of the right line A B into thirty equal parts, so that the whole line A B, representing the periphery of the equator, may be divided into 360 degrees.

4. From the poles D and E, fig. 119, with the interval of 23½ deg. describe arches a, b; there will be twelve parts of the polar circles.

5. After the like manner, from the same poles D and E, with the interval of 66¼ deg. reckoned from the equator, describe
describe arches $c, d$; there will be twelfth parts of the tropics.

6. Through the degree of the equator $r$, corresponding to the right ascension of any given star, and the poles $D$ and $E$, draw an arch of the circle, and taking in the complements of the declination from the pole $D$, describe an arch intersecting it in $i$; this point $i$ will be the place of that star.

7. All the stars of a constellation being thus laid down, the figure of the constellation is to be drawn according to Bayer, Hevelius, or Flamsteed.

8. Lastly, after the same manner are the declinations and right ascensions of each degree of the ecliptic $d g$ to be determined.

9. The surface of the globe thus projected on a plane is to be engraved on copper, to save the trouble of doing this over again for each globe.

10. A hall, in the mean time, is to be prepared of paper, platter, &c. after the manner above directed, and of the intended diameter of the globe: on this, by means of a semi-circle and style, is the equator to be drawn; and through every 30th degree a meridian. The ball thus divided into twelve parts, corresponding to the segments before projected, they are to be cut from the printed paper, and pasted on the ball.

11. Nothing more remains but to hang the globe, as before, in a brazen meridian and wooden horizon; to which may be added a quadrant of altitude $H I$, fig. 120, made of brass, and divided in the same manner as the ecliptic and equator.

If the declinations and right ascensions of the stars be not given, but their longitudes and latitudes in hemispheres, the surface of the globe is to be projected after the same manner as before: except that, in this case, $D$ and $E$, fig. 121, are the poles of the ecliptic, and $f b$ the ecliptic itself; and that the polar circles and tropics, with the equator $g d$, and the parallels thereof, are to be determined from their declinations.

One of the fullest catalogues of the stars is that of Mr. Flamsteed; wherein the right ascensions and declinations, as well as the longitudes, latitudes, &c. are everywhere expressed.

Globe, use of the celestial. The use of this instrument is very extensive; there being scarcely any thing in the spherical astronomy but may be exhibited thereby.

The principal points are contained in the following problems, with their solution; which will lead the reader enough into the nature and reason of this noble instrument, to apply it, of his own accord, in any other cases.

To find the right ascension and declination of a star, represented on the surface of the globe.—Bring the star to the graduated side of the brazen meridian; then the number of degrees intercepted between the equator, and the point on the meridian cut by the star, gives its declination; and the degree of the equator which comes under the meridian, together with the star, is its right ascension.

To find the longitude and latitude of a star.—Apply the centre of the quadrant of altitude over the pole of the ecliptic in the same hemisphere with the star, and bring its graduated edge to the star; the degree on the quadrant cut by the star is its latitude, reckoned from the ecliptic; and the degree of the ecliptic cut by the quadrant its longitude.

To find the sun's place in the ecliptic.—Seek the day of the month in the proper calendar on the horizon, and against the day in the circle of signs is the sign and degree the sun is in for that day; this done, find the same sign upon the ecliptic, on the surface of the globe; this is the sun's place for that day.

To find the declination of the sun.—The sun's place for the day given being brought to the meridian, the degrees of the meridian intercepted between the equinoctial and that place, are the sun's declination for that day at noon.

To find the place of a planet, with its right ascension and declination; its longitude and latitude for the time being given.—Apply the centre of the quadrant of altitude on the pole of the ecliptic (the pole, we mean, of the same denomination with the latitude), and bring it to the given longitude in the ecliptic: this point is the planet's place; and bringing it to the meridian, its right ascension and declination will be found, as already shewn of a star.

To rectify the globe, or adjust it to the place, &c. so as it may represent the present state or situation of the heavens.—1. If the place be in north latitude, raise the north pole above the horizon; if in south, raise the south pole; till the arch intercepted between the pole and horizon be equal to the given elevation of the pole. 2. Fix the quadrant of altitude on the zenith, $z$, on the latitude of the place. 3. By means of a compass or meridian line, place the globe in such a manner as that the brazen meridian may be in the plane of the terrestrial meridian. 4. Bring the degree of the ecliptic the sun is in to the meridian, and set the horary index to twelve; thus will the globe exhibit the face of the heavens for the noon of that day. 5. Turn the globe till the index come to any other given hour; thus will it shew the face of the heavens for that time.

To know all the stars and planets by means of the globe.—1. Adjust the globe to the place of the heavens for that time. 2. Look on the globe for some one star which you know, e. g. the middlemost star in the tail of the Great Bear. 3. Observe the positions of the other more conspicuous stars in the same constellation; and by transferring the eye from the globe to the heavens, you will easily note the star there. 4. After the same manner you may proceed from this to the neighbouring constellations, till you have learned them all.

If the planets be represented on the globe, after the manner above described, by comparing them with the neighbouring stars you will likewise know the planets.

To find the sun's oblique ascension, his eastern amplitude, and azimuth, with the time of rising.—1. Rectify the globe for the hour of twelve, and bring the sun's place to the eastern side of the horizon: then the number of degrees, intercepted between that degree of the equator now come to the horizon and the beginning of Aries, is the sun's oblique ascension. 2. The degrees on the horizon, intercepted between the east point thereof and the point wherein the sun is, is the ortive or rising amplitude. 3. The hour, pointed to by the index, is the time of the sun's rising. 4. Turning the globe till the index points to the present hour, lay the quadrant to the sun's place; the degree cut by the quadrant, in the horizon, is the sun's azimuth.

To find the sun's oblique ascension, western amplitude, and azimuth, with the time of setting.—The solution of this problem is the same as that of the former; excepting that the sun's place must be here brought to the western side of the horizon, as in the former it was to the eastern.

To find the length of day and night.—1. Find the time of the sun's rising, which being numbered from midnight, the double thereof gives the length of the night. 2. Subtract the length of the night from the whole day, or twenty
GLOBE.

To find the rising, setting and culminating of a star; its
continuance above the horizon for any place and day; to-
tgether with its oblique ascension and descension, and its easter
and western amplitude and azimuth.—1. Adjust the globe
to the state of the heavens at twelve o'clock that day.
2. Bring the star to the eastern side of the horizon; this
will give the western amplitude and azimuth, and time of
rising, be found, as already taught of the sun.
3. Bring the same star to the western side of the hori-
zon; thus will the western amplitude and azimuth, and the
time of setting, be found.
4. The time of rising, subtracted from that of setting, leaves the continuance
of the star above the horizon.
5. This continuance above the horizon, subtracted from twenty-four hours, leaves the time of its continuance below the horizon.
6. Lastly, the hour to which the index points, when the
star is brought to the meridian, gives the time of its cul-
imination.

To find the altitude of the sun, or star, for any given hour
of the day or night.—1. Adjust the globe to the position
of the heavens, and turn it till the index point at the
given hour. 2. Fix on the quadrant of altitude, at
90 degrees from the horizon, and bring it to the sun’s or
star’s place; the degrees of the quadrant, intercepted
between the horizon and the sun or star, is the altitude
required.

The altitude of the sun by day, or of a star by night, being
given, to find the time of that day or night.—1. Rectify the
globe as in the preceding problem. 2. Turn the globe
and quadrant, till such time as the star, or degree of the
ecliptic the sun is in, cut the quadrant in the given de-
gree of altitude; then does the index point at the hour
fought.

The azimuth of the sun or a star given, to find the time of
the day or night.—Rectify the globe, and bring the quad-
rant to the given azimuth in the horizon; then, turn the
globe, till the star come to the same; then will the index show
the time.

To find the interval of time between the risings of two stars,
or the culminations.—1. Raise the pole of the globe so
many degrees above the horizon, as is the elevation of
the pole of the place. 2. Bring the first star to the hori-
zon, and observe the time the index points to. 3. The
same do by the other star; then subtracting the former
time from the latter, the remainder is the interval between
the risings.

After the like manner is the interval between two cul-
iminations found, by bringing both stars to the meridian.

The day of the month being given, to find when any star will
come to the meridian.—Rectify for the sun’s place; turn the
globe till the given star comes to the meridian; then the
index will point to the time fought.

To find when any given star will come to the meridian, at
any given hour of the night.—Bring the given star to the meri-

dian; set the index to twelve above noon; then turn the
globe eastward, till the index points to an hour as far
distant in the forenoon from twelve as the given hour is
in the afternoon, observe the degree of the ecliptic then at the
meridian, over-against which degree, in the calendar, is the
day of the month, when the given star will be upon the
meridian at the given hour.

By observation of a star upon the meridian, to find the hour
of the night.—Rectify for the latitude and the sun’s place;
bring the given star to the meridian, and the index will
show the hour of the night.

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To find the beginning and ending of the twilight.—1. Rectify the globe, and set the index to the
thirteenth hour, the sun’s place being in the meridian.
2. Note the sun’s place, and turn the globe westward, as
also the quadrant of altitude, till the point opposite the
sun’s place cut the quadrant of altitude in the eighteenth
degree above the horizon; then will the index show the time
when the twilight commences in the morning.
3. Taking the point opposite to the sun, bring it to the eastern hemisphere, and turn it, till it meet with the quadrant of latitude in the eighteenth degree; then will the index show the time
when the twilight ends.

Given the sun’s longitude and the obliquity of the ecliptic, to
find the sun’s right ascension and declination.—Find the sun’s
longitude or place on the ecliptic, and bring it to the

meridian. Then the arc of the equator, between the
first point of Aries and the meridian, shows the sun’s
right ascension; and the arc of the meridian between the
equator and the ecliptic shows the declination.

Given the obliquity of the ecliptic and the sun’s declination, to
find the sun’s longitude and right ascension.—Mark the sun’s
declination on the meridian, and turn the globe till the
 ecliptic comes under the figure; then will the distance from
the meridian to the first point of Aries show the sun’s
longitude on the ecliptic, and its right ascension on the

equator.

Given the obliquity of the ecliptic and the sun’s right ascen-
sion, required the sun’s declination and longitude.—Bring the sun’s
right ascension in the equator to the
meridian, then
will the interpolated arc of the ecliptic to Aries show the sul’s
longitude; and the arc of the meridian, that is between the
sun’s right ascension and longitude, will show the declination.

To find on what day the sun begins to shine constantly at any
given place in either of the frigid zones, and how long he con-
tinue to shine without intermission at that place.—Subtract
the latitude of the given place from 90, and find in what
two days of the year the sun’s declination is exactly equal to
the remainder, and of the same kind as the latitude of the
place; then on the first of these days in the spring quarter,
the sun shines to set at the given place, and shines without
intermission there till he arrives at another point of the
ecliptic, as many degrees on the other side of the summer
solstice, when his declination is again equal to the comple-
ment of the latitude; the space of time between those two
days is the length or duration of the long day.

To find the latitude of those places in the north frigid zone,
where the sun begins to shine constantly on any day between the
vernal equinox and the summer solstice, or in the south frigid zone
on any day between the autumnal equinox and the winter solstice.

Find the sun’s declination for the given day; subtract it
from 90, and the remainder will be the latitude of those
places: where the sun begins to shine constantly the latitude
is of the same kind as the sun’s declination.

To determine under what latitude two given stars rise or set at
the same time.—Bring one of the stars to the horizon, and,
keeping it there, raise or depress the pole till the other is on
the horizon at the same time, observing whether this is
affected on the east or west position of the horizon; then
the degree of the meridian, intersected by the horizon, will
be the latitude of the place required.

To find at what place a given star is vertical at any given hour
at London; e.g. at what place will Capella be vertical the
24th of March at 10 o’clock afternoon, at London time.

N. B.—This problem requires the assistance of both the
terrestrial and celestial globes.

1. Find, as above, the time of the meridian passage of the
star;
GLOBE.

1. The given place being brought to the meridian, count as many degrees on the meridian from the equator towards the other pole; the point which is thus arrived at is the place of the anteci.

2. Note the degree of the meridian over the given place and its antecedent, and turn the globe till the opposite degree of the equator come under the meridian; or, which amounts to the same, till the index, which before stood at twelve, come to the other twelve: then will the place, corresponding to the former degree, be the periclin; and the latter, that of the antecides.

3. Find what place of the earth the sun is vertical at any time given. 1. Bring the sun's place found in the ecliptic to the meridian, and the index to the hour of twelve, noting what point of the meridian corresponds thereto. 2. If the given hour be before noon, subtract it from twelve hours, and turn the globe towards the west, till the index points at the hours remaining; thus will the place required be under the point of the meridian before noted. 3. If the hour be after noon, turn the globe in the same manner towards the east, till the index points at the given hour; thus, again, will the place required be found under the point of the meridian before noted.

If, at the same time, you note all the places which are under the same half of the meridian with the place found, you will have all the places to which the sun is then in the meridian; and the opposite half of the meridian will shew all the places in which it is then mid-night.

A place being given in the torrid zone, to find the two days in the year wherein the sun is vertical in the same. 1. Bring the given place to the meridian, and note the degree of the meridian corresponding thereto. 2. Turn the globe about, and note the two points of the ecliptic passing through that degree. 3. Find on what days the sun is in these points of the ecliptic: for on these days he is vertical to the given place.

To find those places in the torrid zone wherein the sun is vertical on a given day. Bring the sun's place in the ecliptic to the meridian; then turning the globe round, note all the places which pass through that point of the meridian; those are the places required.

After the same manner may be found what people are afflicted for any given day.

The day and hour at any place being given, to find where the sun is vertical at that hour. Bring the sun's place to the meridian, and the degree over it is the sun's declination at that time; then bring the given place to the meridian, and set the index to the given hour; turn the globe till the index points at twelve, and the place on the globe which is under the degree of the sun's declination has the sun then vertical.

A place being given in the frigid zone, to find the time when the sun begins to appear above the horizon, and when it begins to disappear; and also the length of the longest day or night in that place. Rectify for the latitude; bring the ascending part of the ecliptic, i. e. for latitudes north of the tropic of Cancer the semicircle intercepted between Capricorn and Cancer, to the fourth point of the horizon; observe the degree of the ecliptic which cuts that point; and find when the sun enters that degree, and this will give the time when the sun begins to appear in that latitude. Bring the descending part of the ecliptic to the same point of the horizon, and the calendar will shew when the sun leaves that latitude and disappears. Again, bring the ascending part of the ecliptic to the north point of the horizon, and the degree, as before, will shew, in the calendar when the longest day begins; and by bringing the descending part of the ecliptic to the same north point, we shall find, in the same manner, when the longest day ends.

To find the latitude of the places wherein any given day is of any given length. 1. Bring the sun's place for the given day to the ecliptic, and set the index to the hour of twelve. 2. Turn the globe, till the index points at the hour of rising or setting. 3. Raise and depress the pole till the sun's place appear in the eastern and western side of the horizon; then will the pole be duly elevated, and, consequently, the latitude given.

To find the latitude of those places in the frigid zone wherein the sun does not set for a given number of days. 1. Count so many degrees from the next tropic, towards the equinoctial point, as there are units in half the number of the given days; because the sun, in its proper motion, goes nearly a degree every day. 2. Bring the point of the ecliptic, thus found, to the meridian; and its distance from the pole will
GLOBE.

will be equal to the elevation of the pole, or latitude of the places required.

Any hour of the day or night being given, to show all those places to which the sun rises and sets; where it is noon or midnight; and where day or night.—1. Find what place the sun is at that time vertical to, as already taught. 2. Let this place be brought to the zenith of the wooden horizon, i.e. elevate the pole as the latitude of that place requires and then will the places on the eastern side of the horizon be those the sun is setting to; and on the western side, those he rises to; those under the upper semi-circle of the meridian have it noon; and those under the lower, midnight. Lastly, to those of the upper hemisphere it is day; and to those in the lower, night.

Hence, as in the middle of an eclipse, the moon is in that degree of the ecliptic opposite to the sun's place; by the present problem it may be shown what places of the earth then see the middle of the eclipse, and what the beginning or ending.

To find what places of the earth a planet, e.g. the moon, is vertical to any day of the year.—1. Mark the planet's place on the globe, as above taught. 2. Bring this place to the meridian, and note the degree over it. 3. Turn the globe round, and the places which pass under the point are those required.

The declination of a star, or any other phenomenon, given, to find the place of the earth the star is vertical to.—Count as many degrees in the meridian, from the equator towards one pole, as are equal to the given declination; viz. towards the north, if the declination be to the northward; and towards the south, if the declination be south. Then turning it round, the places that pass through the extremity of this arch in the meridian are the places required.

To determine the place of the earth where any star, or other celestial phenomenon, will be vertical at a given hour.—1. Elevate the pole according to the latitude of the place, from whole noon or midnight the hours are numbered. 2. Bring the sun's place for that day to the meridian, and set the index at twelve o'clock. 3. Determine the place of the star on the surface of the globe, and bring it to the meridian; the index will show the difference of time between the impulse of the sun and star to the meridian of the place: note the point of the meridian over the place of the star. 4. Find in what places of the earth it is then noon, and set the index to twelve o'clock. 5. Turn the globe towards the well, till the index has passed over the interval of time between the culmination of the sun and star. Then, under the point of the meridian, before observed, will the place required be found. And hence may always be found what place a star, or other phenomenon, rises or sets at any given time.

To place the globe in such manner, under any given latitude, as that the sun shall illuminate all those regions which be actually illuminated on earth.—1. Rectify the globe, i.e. elevate the pole according to the latitude of the place; bring the place to the meridian, and set the globe north and south by the compasses; thus, the globe having the same situation with regard to the sun as the earth has, that part thereof will be illuminated which is illuminated on earth. Hence also the globe being set in the same manner, when the moon shines, it will show what parts are then illuminated by the moon.

And in the like manner, we may find when the sun and moon rise and set at any given time.

To find the distance of two places on the globe.—Take the given places in the compasses, and apply them to the equator: the degrees which there subtend being reduced into miles, leagues, or the like, give the distances required.

The same may be done, and that more commodiously, by laying the graduated edge of the quadrant of altitude over the two places, and noting the degree intercepted.

To find how any one place bears from another.—Bring one place to the meridian, and lay the quadrant of altitude over the other, and it will show on the horizon the point of the compass on which the latter bears from the former.

Problems on the terrestrial globe may sometimes be advantageously solved, by considering the horizon as the circle of illumination, and bringing the sun's place to the zenith.

To find for any given day and hour those places where the sun is then rising or setting: these places are, where it is noon, and in particular that place where the sun is vertical: these places have morning or evening twilight; and those places where it was midnight.—Find the sun's place in the ecliptic for the given day, bring it to the brazen meridian, and mark its declination.

Elevate the (north or south) pole as many degrees above the horizon as are equal to the sun's declination (north or south). Bring the given place to the meridian, and set the index to the given hour, then turn the globe on its axis, till the index comes to the upper twelve, and fix the globe in that position. All these places along the western edge of the horizon have the sun rising; those along the eastern edge have the sun setting; it is noon to the places under the brazen meridian, and amongst them the sun is vertical to that place, which stands under the degree of the sun's declination.

Those places that are within 18° of the western semi-circle of the horizon have morning twilight, and those within 18° of the eastern semi-circle have evening twilight: and it is midnight at all those places under that part of the brazen meridian which is below the horizon. In short, it is day to all places above the horizon, and either twilight or dark night to all those which are below it.

The day and hour of a lunar eclipse being given, to find those places where it will be visible.—Find the place where the sun will be vertical when the eclipse begins, and rectify the globe, in respect to latitude, for the antipodes of that place. Then bring the antipodes to the upper part of the brazen meridian, and fix the globe in that position, and the beginning of the eclipse will be visible to all places which are then above the horizon.

To find the proportion which the land bears to the sea.—For this purpose Dr. Long proposes to take the papers of a large terrestrial globe, and after separating the land from the sea with a pair of scissors, to weigh them carefully in scales. This method supposes the globe to be exactly delineated, and all the papers of equal thickness. By an experiment on the papers of Mr. Senex's eighteen inch globe, he found that those comprehending the sea weighed 245 grains, and the others only 124; whence he infers, that almost three-fourths of the surface of our earth between the polar circles are covered with water, and that little more than one-fourth is dry land. Dr. Long omitted weighing the papers within the polar circles, because the proportion which the land bears to the sea within them is not ascertained. Long's Astron. vol. i. p. 163. See Magnitude of the Earth.

GLOBE. To confirm a dial by the. See Dial.
GLOBE.

Standing directly over the north pole of the ecliptic, and perpendicular to that part of the surface of the globe. On this pin are two moveable collets at D and H, to which are annexed the quadrantal wires N and O, carrying two little balls representing the fun and moon. The collet D is fixed to the circular plate F, on which are engraved the 293 days of the moon's age, beginning under the wire N, which, as it turns round, carries with it the plate B. The wires are fixed or slackened by the screw G, and the two little balls are made to rise and set at the same time and on the point of the horizon, for the day to which they are rectified, as the fun and moon do in the heavens. The ball representing the moon may be screwed as many degrees to either side of the ecliptic, as her latitude amounts to at any given time; and for this purpose, S is a small piece of paleteboard, the curved edge of which at S is to be set upon the globe at right angles to the ecliptic, and the dark line over S to stand upright upon it: from this line, on the convex edge, are drawn the 51 degrees of the moon's latitude on both sides of the ecliptic; and when this piece is set upright on the globe, its graduated edge reaches to the moon on the wire O, by which means she is easily adjusted to her latitude found by an ephemeris. The horizon of this globe is supported by two semi-circular arches, because pillars would stop the progress of the balls, when they go below the horizon in an oblique sphere. This globe is rectified by elevating the pole to the latitude of the place, bringing the sun's place in the ecliptic for the given day to the brazen meridian, and setting the hour-index to twelve at noon; then, setting the fun directly over his place in the meridian, and the moon over her place in the ecliptic, by fixing her wire under the number that expresses her age for that day on the place of F; and, lastly, having the curved edge of the palette-board S over the ecliptic below the moon, and adjusting the moon to her latitude over the graduated edge of the palette-board. Having thus rectified the globe, turn it round, and observe on what point of the horizon the sun and moon balls rise and set; for these agree with the points of the compass on which the sun and moon rise and set in the heavens on the given day: and the hour-index shows the times of their rising and setting, and also the time of the moon's setting over the meridian. This globe is also contrived for exhibiting the phenomena of the harwest-moon, &c. Phil. Trans. No. 483. art. 21. in vol. xiv. p. 535; or Ferguson's Atron. p. 291.

Globe, Distilling. See Dialling.

Gloves, Patent, are those with the improvements of Mr. Neale, for which he obtained his majesty's letters patent; by means of which he solves several astronomical problems, which do not admit of solution by the common globes.

Globe, Planetary, is a machine contrived and described by Mr. Ferguson; in which T (Plate XV. Afternoon, fig. 135.) is a terrestrial globe fixed on its axis standing upright on the pedestal C D E, on which is an hour circle, having its index fixed on the axis, which turns somewhat suddenly in the pedestal, so that the globe may not be liable to shake: to prevent which, the pedestal is about two inches thick and the axis goes quite through it, bearing on a shoulder. The globe is hung in a graduated brazen meridian, much in the usual way; and the thin plate N, N E, E, is a moveable horizon graduated round the outer edge, for shewing the bearings and amplitudes of the fun, moon, and planets. The brazen meridian is grooved round the outer edge; and in this groove is a slender semi-circle of braza, the ends of which are fixed to the horizon in its north and south points: this semi-circle slides in the groove as the horizon is moved in rectifying it for different latitudes. To the middle of the semi-circle is fixed a pin, which always keeps in the zenith of the horizon, and on this pin the quadrant of altitude q turns; the lower end of which, in all positions, touches the horizon as it is moved round the same. This quadrant is divided into 90 degrees from the horizon to the zenithal pin on which it is turned, at 90. The great flat circle of plate A B is the ecliptic, on the outer edge of which the signs and degrees are laid down; and every fifth degree is drawn through the rest of the surface of this plate towards its centre. On this plate are seven grooves, to which seven little balls are adjusted by fixing wires, so that they are easily moved in the grooves, without danger of starting out of them. The ball next the terrestrial globe is the Moon, the next without it is Mercury, the next Venus, the next the Sun, then Mars, then Jupiter, and lastly Saturn; and in order to know them, they are separately stampt with the following characters: G, S, G, 0, G, S, 2, b. This plate or ecliptic is supported by four strong wires, having the lower ends fixed into the pedestal at C, D, and E, the fourth being hid by the globe. The ecliptic is inclined 23 1/2 degrees to the pedestal, and is therefore properly inclined to the axis of the globe which stands upright on the pedestal.

To rectify this machine.—Set the Sun, and all the planetary balls, to their geocentric places in the ecliptic for any given time, by an ephemeris; then set the north point of the hor-
the time of the day, and the quadrant will cut the true azimuth, or bearing of the sun for that time: the difference between which, and the bearing shown by the azimuth compass, is the variation of the compass in that place of the earth. Ferguson's Alphon. p. 292, &c.

Globe Amaranth. See Gomphrena.

Globe Amaranth, in *Natural History*, is a singular, minute, aquatic animal, whose form seems exactly globular, without either heads, tails, or limbs. Leaves in all directions, either rolling like a bowl, or gliding along smoothly without turning itself at all. Its whole body is transparent, except where it is covered with circular black spots; some of which have fix or feven, some one, two, three, four or five, and others none at all. These spots are probably the eggs or young ones of the animal. The general appearance of the body exhibits a kind of soft moveable hairs or bristles, by means of which it is conjectured the motions of the animal may be performed. Baker's Microf. 1753, p. 322, &c.

Globe Daisy. See Globularia.

Globe Fjó, in *Ichthyology*, a name by which some species of the obstruction are called. See Ostracion.

Globe Flower, in Botany. See Schizanthus.

Globe Ranunculus. See Thollouis.

Globe Thistle. See Echinops.

GLOBULAR CHART, a representation of the surface, or some part of the surface, of the terraqueous globe upon a plane; wherein the parallels of latitude are circles nearly concentric, the meridians, curves, bending towards the poles; and the rhumb-lines also curves. The merits of this chart consist in this, that the distances between places on the same rhumb are all measured by the same scale of equal parts; and the distance of any two places in the arch of a great circle, is nearly represented in this chart by a straight line. Hence land-maps, made according to this projection, would indisputably have great advantages above those made any other way. See Map.

But for sea charts, and the use of navigation, it is yet controverted, whether the globular chart be preferable to Mercator's, where the meridians, parallels, and particularly the rhumb-lines, are all straight lines; inasmuch as straight lines are found more easy to draw and manage than curves, especially such as rhumb-lines on the globular chart are. This projection is not new, though not much taken notice of till of late. It is mentioned by Thoemsy in his Geography; as also by Blondeau, in his Exercitix. See Chart.

Globular Projection. See Projection.

GLOBULAR Sailing. See Great-circle Sailing.


Gen. Ch. Cal. Common perianth imbricated, with equal scales, the length of the disc; proper perianth of one leaf, tubular, five-leaf, acute, permanent. Cor. General one nearly equal; proper one of a single petal, tubular at the base: limb in five segments; the upper lip very narrow, the lower rounded; the lower consisting of three larger, equal segments. Stam. Filaments four, simple, as long as the proper corolla; authors distinct, incumbent. Fil. Germ. superior, ovary, style simple, the length of the filaments. Stamina obtuse. Fertil. none; proper calyx flattening up and enclosing the solitary, ovate fruits. Common receptacle oblong, divided by scales.

Eff. Ch. Common calyx imbricated; proper one tubular, inferior. Partial corolla with the upper lip cloven; under one three-leaf, Receptacle chaffy.

1. G. longifolia. Long-leaved Globularia. Willd. Sp. Pl. v. 1. 539. (Alpum live Herba terriblis; Sloan, Jun. v. 19. t. 5. f. 5.) — Stem furzy. Leaves linear—linear, entire. Heads of flowers axillary. —This green-house shrub is a native of Madeira, flowering in July and August. The wood of this plant is hard and white, with a very large pith, and an unequal light brown or grey bark. Leaves growing very thick towards the ends of the branches. Flowers consisting of several spherical heads, of a blueish colour. Seed pappus, all over downy.

2. G. Alysum. Herb Terrible. Linna. Sp. Pl. 139. (Alpum montis Ceti; Ger. em. 506.) — Stem furzy. Leaves obvato-lanceolate, three-toothed or undivided. Heads of flowers terminal. —This green-house shrub, found in various parts of the south of Europe, flowering from August to November. Root woody. Leaves alternate, falcated in the lower acida, near an inch long, glaucous, some are undivided, others three-toothed. Flowers blue or purple. The whole plant is bitter, and purgative in a violent degree.

3. G. bifragaria. Linna. Sp. Pl. 139. (Scabiosa bifragaria five G. frutecens; Plini. Amath. t. 52. f. 5.) — Stem furzy. Radial-leaves wedge-shaped, abrupt; stem-leaves lanceolate. — Native of the woods of India. Stem of many straight, hard, leafy branches, each about five or six inches high. Flowers in a blue terminal head.

4. G. vulgaris. Blue Daisy. Linna. Sp. Pl. 139. (Aphyllanthus anguillarum; Camer. Hort. t. 7.) — Stem herbaceous. Radial-leaves three-toothed. Stem-leaves lanceolate. — A hardy perennial, common in some parts of Europe, and flowering in May and June. Root woody. Stem a pan high, terminated by a head of deep blue flowers. Willdenow mentions two varieties of this species, one with a cHaffy stem, the other with ribbed flowers.

5. G. spinosa. Linna. Sp. Pl. 139. — Radial-leaves crenate-prickly; stem-leaves entire, pointed. — Native of Spain, Alhdbus having gathered it in Granada. It flowers in May. —Radial-leaves numerous, small, stiff and notched, each notch ending in a prick. Flowers composing an oblong sphere, hairy. — We are not acquainted with any figure of this species.

6. G. cordifolia. Linna. Sp. Pl. 139. Jacq. Autr. t. 245. — Stem nearly naked. Leaves wedge-shaped, with three points; the middle one very small. — Native both of hills and vales in Hungary, Austria, and Switzerland, flowering from April to July. Root creeping, each joint throwing out a cluster of leaves, from the centre of which springs a smooth purplish stem about four inches long, terminated by a head of blue flowers.

7. G. hena. Willd. Sp. Pl. v. 1. 532.— Flower-flasks naked, very short, leaves spatulate, somewhat ovate, entire. — Found in the south of France, and on the Pyrenees, where our dried specimen was gathered by Dr. Noeiden. Root woolly and very thick, bearing numerous tufts of little leaves, among which arise the short, solitary flower-flasks. Flowers forming a terminal head. — It has never been figured.

per side. *Flower-flax* about six inches long, smooth, fili-ated, purplish towards the top, bearing a roundish head of blue flowers.

G. *orientalis*. Linn. Sp. Pl. 140. — "Stem nearly naked. Hands of flowers alternate, siliques, leaves ovate, somewhat lanceolate, entire."—This species is a native of Natalia.

—Root perennial. Leaves numerous, obovate, running down into the foot-falks, acute, undivided, naked. Stem a foot high, herbaceous, perfectly simple. Leaves alternate, small, lanceolate, remote. Heads of flowers alternate, siliques, from seven to ten, at the summit of the stem.—Linnaeus described *G. orientalis*, having received it from M. Biorling, but it is nowhere figured.

*Globularia*, in Gardening, contains plants of the herba-
ceous, flowery, perennial kind; of which the species chiefly cultivated are the three-toothed globularia (*G.* alc-
pum); and the common globularia or blue daisy (*G.* vulgaris); but others may be easily raised.

There are two varieties of the half-fast, one with a white flower, and another that has a leafy stem.

Method of Culture.—In the first it may be effected by plant-
ing cuttings of the young branches in April, just before they begin to shoot, in pots of light fresh mould, plunging them in a very moderate hot-bed, and giving them due water and shade, till they have stricken root. After this they should be removed from the bed, and be gradually hardened to the open air, being protected during the winter months.

The second may be readily increased by parting the roots, as in the common daisy, planting them out in the early part of the autumn, in moist shady situations. They succeed best in such loamy soils as are rather moist in their quality.

The first affords variety among potted plants, and the latter in the fronts of the more moist and shady borders and clumps of pleasure-grounds.

*Globule, Globulus*; a little globe; otherwise called a *sphærule*.

Thus the red particles of the blood are called globules of the blood, on account of their redness and smallness. (See Blood.) The Cartesians call the particles broken off the matter of the first element, globules of the second element. See *Cartesian, &c.*

*Globulus Nast* is used for the lower, flexible, cartilaginous part of the nose.

*Glochidion*, in Botany. See *Bradlea*.

*Gloesztli*, in Geography, a town of Walachia; 50 miles N. of Bucharest. N. lat. 49° 13'. E. long. 26° 16'.

*Gloau*, a principality of Silefia, on the E. side of the Oder, bordering on Poland; producing corn and wine in abundance, in some parts affording mines of iron. The salt mines feed many theep, and the wool is wrought into different manufactures. It is divided into six circles. In the year 1241, it was governed by its own princes; but afterwards it belonged to the king of Poland, to the king of Bohemia, to the emperor, and half of all to the king of Prussia.

*Gloau*, Gros or Great, the capital of the principality of the same name, built in 1110 on the S. side of the Oder, taken by the Prussians in 1741, and strengthened by new fortifications. It is the seat of a governor, a command-
ant, divers tribunals, and a bishop's court, &c. It contains two Catholic churches, of which one is collegiate, three convents, a Lutheran church and school, and a chapel for Calvinists; 62 miles N.W. of Breslau. N. lat. 51° 39'. E. long. 16° 5'.

*Gloav*, Ober, or Little, a town of Silefia, in the prin-
cipality of Oppeln; 19 miles S. of Oppeln. N. lat. 50° 16'. E. long. 15° 48'.

*Glochmis*, a town of Austria; 28 miles S. of Vienna.

Gloken-Spessse, in Mineralogy, a term used by the Germans to express a sort of impure regular of bismuth, obtained by accident, sometimes in the making of smalt. The bismuth ores are often so intimately mixed with the cobalt, that they cannot be separated from them. In this case, the arsenic being raised in the flowers, there remains at the bottom, instead of the fixed vitrifiable earth of the cobalt, a sort of impure regular of a reddish col-
our. This is bismuth, with admixture of the earth of cobalt, and other extraneous matter. They sometimes call this whole matter by the common name of specifie; but more usually they separate it into two parts, and call the under part, which is most solid, gloken-specifie, and the upper part they distinguish by the name of zs calda-
rum.

Gloomerellis, in our Old Writers, commissaries ap-
pointed to determine differences between scholars of a school or university, and the townsmen of a place. In the edict of the bishop of Ely, anno 1276, there is mention of the master of the gloomerells.

Gloomme, or Glomen, in Geography, called also the Star Ely, or great river, the chief river of Norway, springs from the lake of Orfunden on the north of the Farnund, and after running a course nearly south about 300 British miles, discharges itself into the Northern Ocean near Fredriclkabt, to which town about 50,000 trees are annually floated upon it. This river, being full of cataracts and shoals, is not navigable. Before it receives the Worme, which flows from the lake Mofs, it is about as broad as the Thames at Henley. In its course it presents a broad surface, some-
times watering pleasant valleys, sometimes intercepted by sand-banks, over which it frequently shifts its course, some-
times winding between rocky cliffs, and precipitating itself in frequent cataracts. Near Kongsvinger it is as broad as the Thames at Putney. Its rugged course, however, must render it a tremendous torrent.

Glôni, a river of Bavaria, which runs into the Ammer, near Crantzberg.

Glôns, a town of France, in the department of the Ourte, and chief place of a canton, in the district of Liege. The place contains 1,500, and the canton 8,850, in-
habitants, on a territory of 127½ kilometres, in 23 com-
mmunes.

Glor-Fat, in Rural Economy, a term applied to ani-
imals that are extremely fat.

Gloria Patri, in the Liturgy, a formula of words repe-
et at the end of each Psalm, and on other occasions, to give glory to the Trinity; called also the *Doxology*. It is thus denominated, because it begins in the Latin office with these words; Gloria Patri, q. d. Glory be to the Father, &c.

Pope Damascus is commonly said to have first ordered the rehearsed, or rather, fingling the Gloria Patri at the end of Psalms. Baronius, indeed, will have it to have been used in the times of the apostles; but its use, then, he al-
 lows to have been more obscure, and that it did not become popu-
lar till after the rise of Arianism, when it was made a kind of symbol of orthodoxy.

The fifth canon of the council of Vaison, held in 529, decrees, "that the name of the pope shall always be re-
hearsed in the churches of France, and after the Gloria Patri shall be added *fict erat in principio*, as is done at Rome, in Africa, &c. on account of the heretics, who say,
**GLO**

Globrig, that the "Soa of God had his beginning in time." Fleury.

Gloria in excelsis is also a kind of hymn rehearsed in divine service, beginning with the words Gloria in excelsis Deo, & in terra pax hominibus, &c. Glory be to God on high, on earth peace, &c.

Gloriosa, in Botany, so named on account of the splendour and magnificence of its flowers. Tournefort, objecting to the name given by Linnaeus because it is an adjective, called this genus Metelonica, in which he has been followed by Jussieu, and indeed by all French botanists, though the Linnaean school have refused to adopt this barbarous name.—Linn. Gen. 164. Schreb. 220. Willd. Sp. Pl. v. 2. 95. Ait. Hort. Kew v. 1. 434. Mart. MILL. Dict. v. 2. Gerin. t. 18. Juff. 48. Clats and order, Hexandria Monogynia. Nat. Ord. Sarmentaeceae, Linn. Lilia, Juff.


1. G. Superba. Superb Lily. Linn. Sp. Pl. 437. Rodout. Liliae t. 26. — "Leaves furnished with tendrils." — Native of Malabar and Guiana. It was introduced into Kew Garden in 1600 by the first earl of Portland. A tender flow plant, flowering in July and August. The stem is herbaceous, about a fathom high, round, having two opposite lateral branches, and putting forth a flower-flask from the bosom of each leaf. Leaves alternate, smooth, each ending in a tendril. Flowers pendant, of a most beautiful red and yellow colour. Petals lanceolate, long, waved at the edge, reflexed near the base. This remarkably handsome plant requires an excessive heat to make it flower.

2. G. simplex. Linn. Mant. 62. Willd. Sp. Pl. v. 2. 96. — "Leaves pointed." — Native of Senegal. The leaves are not furnished with tendrils. Flowers blue.—There is no figure of this species known. It was merely taken up from Miller, nor has any thing been found which answers to the description.

Obs. This very beautiful genus is nearly allied to Erythronium.

Gloriosa, in Gardening, comprises a plant of the herbaceous, flowering perennial kind; of which the species cultivated is the superba (G. superba.)

Method of Culture.—It is capable of being increased by planting the offsets from the old roots, either in the autumn after the leaves decay, or in the early spring before they shoot, in pots filled with light earth, plunging them in the barkbed of the flow. The old roots, when taken out of the ground, should be preferred in dry sand during the winter in the flow, or in a dry warm room. It is the practice of some to let the roots remain during the winter in the mould, keeping the pots in the tan-bed; planting out the offsets early in the spring. In either way they should have very little water given them.

When the offsets appear they should be supported by sticks, and in hot dry weather a little water should be sparingly given, as there may be occasion. And the pots in which they are planted should be small, that they may be confined, and put forth stronger pets. Two-penny pots will be large enough for the roots of the greatest sized plants of this nature.

The plants afford much effect by their beautiful flowers among those of the fove kind, when properly intermixed with them.

Glorious Islands, in Geography, two small islands in the Indian sea. S. lat. 11° 32'. E. long. 47° 15'.

Glosskar, a small island in the Baltic, E. of Aland. N. lat. 60° 20'. E. long. 20° 15'.

Gloss, Glossa, a comment on the text of any author, to explain his sense more fully and at large, whether in the same language, or in any other. See Commentary.

The word, according to some, comes from γλόγος, tongue; the office of a gloss being to explain the text, as that of the tongue is to discover the mind. Others derive it from the Latin glos, a filter-in-box, which among lawyers sometimes floats for filter; the glos being, as it were, filter to the text.

Nic. de Lyra composed a gloss or gloss in the Bible, in five volumesfolio. The French say, proverbially of an ill comment, that it is glos d'Orland, plus obscure que le texte.

Gloss is also used for a literal translation, or an interpretation of an author in another language, word for word. Young scholars need an interlineral gloss for the understanding of Juvenal, Horace, Sallust, Periplus, &c.

Gloss is also used in matters of Commerce, &c. for the fibre of silk, fluff, or the like.

Glossary, Glossarium, a kind of dictionary for explaining the obscure, ancient, and barbarous words and phrases of an altered, corrupted, or refined language.

Spelman's glossary, entitled Archaiologicum, is an excellent work; though that author did not begin to study in this way till fifty years of age. M. Du Cange's Latin Glossary in five volumes, Paris, fol. 1733, Balfil, fol. 1762, is a work in high estimation, and containing a fund of the most curious and amusing intelligence. Charpentier's supplement to this work, in 4 volumes, fol. Paris, 1766, is necessary to render this fet of books complete. Du Cange's Greek Glossary in two volumes, fol. Lugd. 1688, is an excellent performance, full of uncommon erudition.

The Greek, Latin, and French glossaries of Du Cange form a series of the most instructive articles in the study of jurisprudence and belles lettres. There is an abridgment of this work in 6 vols. 8vo.; which, however, contains some matter not common to either of the preceding. This abridgment is exceedingly rare. As a caution to the purchasers of the Greek Glossary, we inform them that in the article "Moneta" (Coins, vol. iv. p. 592) there should be 10 plates of engravings of coins, and monograms of various princes and sovereigns of Europe, which are sometimes wanting, and thus the value of the edition is materially depreciated.

Lindenbrook has a Glossary on the laws of Charlemagne, &c.

Glossocatochos, in Surgery, an instrument for depressing the tongue. It is described by Paulus Aegineta, and the term is derived from γλώσσα, the tongue, and κατά, to r p ref in.

Glossocellae, denoting a swelling and protrusion of the tongue. The word comes from γλώσσα, the tongue, and κελαί, a tumour.

Glossocoma, a retraction of the tongue.

Glossocomia, in the Instrumental Music of the Greeks, a name given by the ancients to a kind of cale for the glottis, or tongues of their flutes, which probably were hautboys, and, consequently, that glottis was a reed. See Glottis.

Glossocomon, in Mechanics, is a name given by Hip-
eru, to a machine composed of divers dented wheels, with pincions serving to raise huge burdens.

GLOSSOCOMON, a term in Surgery, derived from γλωσσα, the tongue, and νυχης, to guard; originally a cafe for the read of a hauboy, but used metaphorically to signify a cafe for a fractured limb.

GLOSSODIA, in Botany, γλωσσα, having the form or appearance of a tongue; in allusion to the peculiar appendage to the internal part of the flower, which resembles the tongue of a serpent, and affords the essential character. Brown Prod. Nov. Holl. v. 1 325—Clafs and order, Gymandra Monogynia. Nat. Ord. Orchidace.


1. G. major. Brown 326.—Appendage cloven half way down; its lobes spreading, acute.

2. G. minor. Ibid.—Appendage to the base; its lobes parallel, obtuse.

Both species are natives of the country near Port Jackson, New South Wales. Their bulbs are undivided, with a laminated coat, and grow in the earth, not parasitickly. Herb hairy. Leaf solitary, radical, its base enclosed in a membranous sheath. Stalk radical, bearing generally one blue flower, rarely two, and furnished with one træctæ besides what accompanies each flower. Brown.

GLOSSOIDES, in Natural History, a name given by some authors to a species of flone, resembling the figure of the human tongue. This is a mere accidental configuration of a common flint or pebble, perfectly indeterminate in size and colour, and owing its form to no animal mould, as the flones found in shells usually do, but is a mere lufus naturæ in the concretion of the flone.


Gen. Ch. Cal. Perianth superior, of one leaf, turbinate, four-toothed, permanent. Cor. Petals four, equal, lanceolate, and suddenly shorter than the calyx, recurved. Nectary a ring round the base of the flyle. Stam. Filaments four, very short; anthers oblong, nearly united into a cylinder, elongated at the top into a membranous lanceolate expansion of two cells, opening inwardly. Flgfl. German inferior, obvolute; flyle thread-shaped, as tall as the flaments; fligmas four, acute. Peric. Drupa pear-shaped, of one cell, crowned by the calyx. Seed solitary, ovate, fricated.


Obf. The above characters appear to be taken by Schreber from Aublet, nor have we any better materials. The only species known is,

1 G. arborensis; Willd. nov. (Votomita guianensis; Aubl. v. 1. 91. t. 35.)—A shrub of a middling size, whose trunk is five or six feet high, and five or six inches thick; the wood yellow, hard and compact. Branches knotty, spreading gradually, leafy. Leaves opposite, elliptical, pointed, entire, six inches long, thick and firm, of a shining green, placed on short stalks, with a deciduous stipula at each side of their base. Flowers white, on short, umbellate, axillary flasks, their petals about half an inch long. This plant is found in the extensive forests of Guiana, about the habitations of the natives. Nothing is recorded respecting its qualities or uses.


Gen. Ch. Cal. Perianth half inferior, of one leaf, minute, five-toothed, permanent. Cor. Petals five, lanceolate, spreading, acute, much longer than the calyx, each bearing at its point a linear-lanceolate, abrupt appendage, almost of the length of the petal, bent back and lying upon it. Stam. Filaments five, very short; anthers roundish. Flgfl. German roundish, encred by a glandular ring, which bears the petals and stamens; flyle none; fligmas five, acute. Peric. Berry roundish, with five furrows, of one cell. Seeds five, angular.

Eff. Ch. Calyx half inferior, with five teeth. Petals five, each bearing an indexed longitudinal appendage. Berry with five seeds.

Obf. Schreber, p. 826, suspècts this genus not to be distinct from Aralia, but the habit confirms Jufliciu's opinion, who separates them widely. Two species are described by Aublet.

1. G. glabræm. (Goupia glabra; Aubl. v. 1. 296. t. 116.)—Leaves smooth.—Native of the forests of Guiana, 30 leagues from the sea, bearing flowers and fruit in November. The trunk is 60 feet or more in height, and two or three feet in diameter, serving to make canoes; the bark smooth and grey; the wood white and light. Branches drooping, furnished with alternate leaves of an ovate, pointed, somewhat unequal figure, entire, rigid, thinning, and smooth, with a branching rib, and fine transverse veins at the back. Flowers yellow, small, many together in foliar axillary umbels. Berry black, globular.

2. G. tamentofsum. Willd. Sp. Pl. v. 1. 1522.—Leaves downy.—Native of the forests of Cayenne and Guiana. Not half so lofty as the former. The bark is wrinkled and dark-coloured. Leaves clothed on both sides with some short hairs. Their juice, which, as well as the bark, is bitter, is used to cure inflammations of the eyes.

GLOSSOPETRA, or GLOTTOPETRA, in Natural History, called also ichthyodontes, steak's teeth, dej-fob's teeth, &c. a kind of extraneous follic, somewhat in form of a serpent's tongue; frequently found in the island of Malta and divers other parts. Some of them are in a high state of preservation, having their enamel and points perfect, and their sharp edges finely ferrated as in the recent teeth.

Naturalists have been much divided as to the nature and origin of these bodies. Steno, De Corpore solido intra folium contento; Ol. Wormius, Differt. de Gloppetra; and Reynchius, De Gloppetris Lunebergiæ, treat of them at large.

The vulgar notion is, that they are the tognes of serpents petrified; and hence their name, which is a compound of γλωσσα, tongue, and νυκης, floure. Hence, also, their traditionary virtue in curing the bites of serpents.

The general opinion of naturalists is, that they are the teeth
teeth of fishes, left on land by the waters of the deluge, and since petrified.

They even specify the very kind of fish, and take it to be that which Theophrastus and the Greek writers call ἀργυρόκτης, and the moderns the flæsk or feadog.

Camerarius cannot persuade himself that the glossopetrae found in England, Malta, and round Montpelier, were ever the teeth of a sea-dog, or any other fish. The chief difficulty, he suggerles, is the small quantity of volatile salt and oil which they afford by distillation. To which Dr. Woodward answers, in defence of the common system, that having lain so long buried underground, it is no wonder they should have lost the best part of their volatile principles. It is certain, that human bones and skulls, long interred, do not afford nearly the quantity of those principles that they would have done immediately after the person's death.

Another example, proposed by Camerarius is, that the glossopetrae, when exposed to the naked fire, turn to a coal; and not to a calx; contrary to what is asserted by Fabius Columba. Dr. Woodward answers, that it is likely enough the glossopetrae, in burning, may assume the form of a coal, before it arrive to that of a calx.

The several sizes of the teeth of the same species, and those of the several species of sharks, afford a vast variety of these foliaceous substances. Their usual colours are black, blue, whitish, yellowish, or brown; and in shape they usually approach to a triangular figure. Some of them are simple; others are trichupidate, having a small point on each side of the large one; many of them are quite straight, but they are frequently found crooked, and bent in all directions; many of them are serrated on their edges, and others have them plain: some are undulated on their edges, and slightly serrated on these undulations. They differ also in size as much as in figure; the larger being four or five inches long, and the smaller of less than a quarter of an inch.

They are most usually found with us in the Irata of blue clay, though sometimes also in other subfusates, and are frequent in the clay-pits of Richmond and of Shelly island, and in other places. They are very frequent also in Germany, but nowhere so plentiful as in the island of Malta.

In the British Irata they rarely occur. Mr. Farey has found them in these Irata only in five places, viz.: in the London clay, probably obtained from the clay-pits above-mentioned; in a bed of the soft or upper chalk in Kent, at Haresfield, near New Malton, &c.; in a green flinty Irata below the chalk, N. of Dunstable, &c.; in the Stonesfield and Collywaxon slate fences, above the Bath free-lime rocks, at Enstone in Oxfordshire, where Woodward procured specimens of these teeth in the jaw, &c.; and in the thick grey lime-rock which lies under and surrounds the South-Wales coal basins (Phil. Trans. N. 334.) Glossopetrae are sometimes found in gravel-pits and other collections of alluvial matters. It is seldom possible to determine to what place in the series of Irata these belong, and they should therefore be carefully distinguished from such as are actually found in the Irata.

The Germans attribute many virtues to these foliaceous teeth; they call them cordials, tubercules, and alexipharmics; and the people of Malta, where they are extremely plentiful, hang them about their children's necks to promote dentition. They may possibly be of as much service this way as an anodyne necklace; and if suspended in such a manner that the child can get them to its mouth, may, by its hardness and smoothness, be of the same use as a piece of coral. See SERPENT'S TONGUE.

GROSSO-PHARYNGEUS, in Anatomy, from γλωσσα, the tongue, and ψαθαι, the words, another name for the constrictor pharyngis superior, which arise from the side of the tongue.

GROSSO-SPATHA, in Surgery, an instrument, called by some the speculum lingue, and used to depress the tongue, in order to look into the fauces.

There are many inflammatory disorders of the mouth, fauces, and palate, which require a depression of the tongue, while they are inspected and treated with proper remedies. The handle of a fiber spoon is made to supply the place of this instrument in soft cases, and answers the purpose very well. Whenever is used, care should be taken to depress gently, in order to avoid the patient pain, as also to avoid irritating the mouth and inflamed parts.

When injections are to be made into the mouth, this instrument or the spoon should also be applied, and the syringe should be conveyed into the mouth over it.

GROSSO-STAPHYLINUS, in Anatomy, from γλωσσα, the tongue, and σταφύλι, the words, another name for the constrictor pharyngis superior. See DEGLUTITION.

GLOTTIDIS RIMA, the fame opening as the glottis. The term rima particularly denotes its slit-like form.

GLOTTIS, from γλωσσα, the tongue, is the opening through which the air passes to and from the lungs in respiration. In this passage the voice is formed. See DEGLUTITION AND LABYRINTH.

Julius Pollux makes the glottis a joint or part of a flute, and Hefychius says that the glottis were little tongues, acted upon by the breath of the player. This description of Hefychius seems to confirm the idea of the ancient nomad flutes being a kind of hautboys.

GLOTTIS, in Ornithology, a name given by many authors to a bird of the long-legged kind, approaching to the nature of our red-hank, but larger and longer legged, and generally known by the name limpha. See SCOLOPAX GLOTTIS.

GLOUCESTER, in Geography, a city in Gloucester-shire, England, is situated in a vale, on a gentle eminence, rising, on the call side, from the river Severn. This opulent city appears to have originated in a Roman station which was situated at King's Holm, near the north-eastern extremity of the present city. The Romans continued to occupy this spot till the disbanding of their own empire occasioned them to quit the island. Its government then reverted to the British princes, under whole domination it continued till about the year 577, when, according to the Saxon Chronicle, it was subjected to the West Saxons, and was reputed one of their principal cities: it was afterwards subjugated by the Mercians, who also obtained possession of the other parts of the county. Under the Saxons it acquired the appellation of Gleau-cellere. The strength and consequence of the city rendering it an object of frequent enterprise, its vicinity was several times the scene of action between the Britons and Saxons. By these conflicts, its buildings were nearly ruined; and the whole place might have sunk into complete decay, if Wolphere, son of king Penda, had not enlarged and adorned it, about the year 679.

This restoration was so perfect, that Bede informs us, it was effaced, about the commencement of the 8th century, as one of the noblet cities in the kingdom. Its early importance is evinced by its having been the residence of various Saxon monarchs; and hence it was denominated a royal city, as it is expressly termed in a grant made by king Edgar to the monks of Worcester, dated at Gloucester in the year 964. By this monarch a battle was fought here with the Danes, who had twice plundered the city in the preceding reigns, and who again ravaged, and partly consumed it by fire, in that of his son Ethelred. Several of the
the Norman and English kings also occasionally resided and transacted public business in this city. A memorable era in the eventful history of Gloucester originated in a contest between Henry III and the barons. "That monarch, in 1253, appointed Sir Maci de Beville, a French knight, sheriff of the county, and constable of the castle within the city. The preference thus given to a foreigner was violently resented by the indignant nobles, who immediately made choice of Sir William Tracy, a native of the shire. He accordingly proceeded to execute the duties of his office in holding a county court, but was suddenly interrupted by De Beville, who, entering with a party of the king's troops, seized the knight, and, with circumstances of peculiar cruelty, hurried him to the castle, where he was committed to close confinement. After this outrage, the barons deputed Sir Roger de Clifford, and Sir John Giffard, with their dependants, to besiege the castle, for the double purposes of rescue and revenge; in a few days they obtained an entrance, and compelled De Beville to retire to the keep; he afterwards surrendered, and was sent as a prisoner to Evesley castle, in the marches of Wales. In the year 1258 Edward I assembled a parliament here, and several laws, connected with the statute of Quo Warranto, were enacted, and have, from that period, been known under the general appellation of the Statutes of Gloucester. In the course of the two next centuries, four parliaments were held here.

The opposition of the Gloucesters to the royal cause, during the reign of Charles I, is generally supposed to have operated fatally against his interest throughout the kingdom: so early as the year 1641, they declared for the parliament; raised a company of volunteers, which they added to their trained bands; procured cannon from London and Bristol, and repaired and strengthened the fortifications; though frequently besieged by the royalists, they successfully re- fused every attack. The ecclesiastical state of Gloucester, during the Roman and former part of the Saxon period of its history, is involved in much obscurity; but in the year 657, Edwy, king of Northumberland, having subdued Mercia, erected Lichfield into a bishop's see, and included Glouceshire within its diocese. This bishopric was soon afterwards divided into the five smaller of Lichfield, Dorchester, Leicester, Hereford, and Worcester; to the last of which this district was annexed, and continued subject, till the reign of Henry VIII., who, by letters patent, dated September 3d, 1541, and afterwards confirmed by act of parliament, erected "the city of Gloucester, the county of that city, and all the county of Gloucester, into a bishopric, with a dean and chapter, by the name of the diocese of Gloucester; and ordained that such part of the then vill and county of Bristol, as formerly was in the diocese of Worcester, should be from henceforward in the diocese of Gloucester for ever."

The church appointed for the cathedral of the new see, was that belonging to the abbey, founded by Wolphere, first Churlian king of Mercia, and Ethelred, his brother and suffecessor, in the year 681. The New Minster, as it is termed in the records, was burnt, with the monastery, in 1087 or 1088; probably at the same time that the city was partly destroyed by the adherents of Robert, brother to William Rufus. Scirlo, then abbot, began a new church in June, 1089; the first stone was laid by Robert, bishop of Hereford; and on the completion of the edifice, in the following year, it was dedicated to St. Peter, by the bishops of Worcester, Rochester, and Bangor. The abbey was again destroyed by fire in 1101 or 1102, but the church was saved. The present magnificent and interesting edifice has been erected at different periods, and consequently displays various specimens of ancient ecclesiastical architecture, in the Saxon, Norman, and English styles. The conversion of the abbey church into a cathedral was the chief cause of its preservation at the reformation; and, to the honour of the inhabitants of Gloucester, it became the object of their peculiar care during the civil wars, after which they obtained a grant of it from Oliver Cromwell. Hence the cathedral has been transferred to the present age, as nearly perfect in all its parts, with regard to its general construction, as it was left by the most favoured of its architects. The eras of erection of the principal parts are known; and hence the characteristic styles of each can be satisfactorily ascertained. The lower part of the nave, the chapels that surround the choir, and the crypt, are presumed to have belonged to the building erected by bishop Aldred, before 1089; the roof of the nave obtained its finishing and form in 1248. In 1310 the south aisle was begun; and part of the south transept was added in 1350. The building of the north transept and choir commenced about the same year; the latter was completed in 1457. Between the years 1301 and 1306, the chanciate cloisters were finished. The chapel of our Lady was built between the years 1457 and 1498; and the centre tower between 1457 and 1518. The interior of this splendid fabric consists of a nave, choir, side aisles, and transepts, with a chapel of our Lady, and several smaller chapels or oratories. From the intersection of the nave and transepts rises a high tower, and on the south side a handsome projecting porch. The roof is sustained on twenty-eight columns, which extend in two rows from the west end to the high altar, where the presbytery forms nearly a semi-circular sweep: the transepts have no isolated pillars. The chapel of our Lady is, as usual, attached to the presbytery; and there are chapels in the north-east and south-east angles of the transepts and choir, with two others projecting in the sweep between those and the chapel of our Lady. The outline, or ground plan of the cathedral, is probably the same at present as designed by bishop Aldred previous to the year 1089; and the crypt remains almost as perfect as the masons left it. The architecture of this subterraneous and gloomy place is massy, and suited to the immense weight resting on the arches, which are turned upon huge short pillars, and strengthened by groins of proportionate solidity. The nave is an interesting specimen of the style which continued to prevail for nearly two centuries after the Norman conquest. The arcade of pendentive round columns, and the rows of semi-circular arches above, impress the mind with ideas of the strength, solidity, and profound solemnity which must have accompanied its original state. The architecture of the well-end is very different from the other parts of the nave; and the vault is covered by intersecting ribs, and ornamented key-ropes; but the remainder is of the plainest description, with three ribs only to each pillar; yet the key-ropes are carved. On each side are eight massive columns; the arches between them are bounded by large mouldings, carved into zig-zags, and other ornaments. Directly over each column, and at some distance, is a range of heads of various characters; some ferone, and others terrac. These serve as brackets to clusters of short pillars, whose capitals display the most beautiful variety of foliage, on which zig-zag wrings extend, serving as a base to other clustered pillars with equally elegant capitals: from these the ribs of the vault commence. The gallery windows, pierced through the wall above the arches, are divided by short thick pillars, and bounded by others, with zig-zag arches: a twisted string separates them from the clerestory windows. The north and south aisles of the nave are nearly in the style of the well-end, with pointed windows, rich ramifications in the arches from the mullions, and fillet-
ed vaults. The arch of entrance to the cloisters from the north aisle is mort elaborately and exquisitely adorned by pil- 1ars, buttresses, niches, pinnacles, foliage, and pendants, and the ingular ornament of twisted pinnacles under the arch. In the south aisle, nail-headed mouldings are introduced as embellishments on each side of the windows. An advanced graduation of style is exhibited in the interior of the south transept; but the most perfect and ornamental degree is diplayed in the chapel of our Lady. The choir is divided from the nave by a screen, designed by Kent.

The dimensions of the cathedral and its several parts are as follow: entir length, indefinite, four hundred and twenty-three feet; length of the nave, one hundred and seventy-five feet; breadth, forty-one feet one inch; height, sixty-four feet six inches; breadth of the north aisle, twenty feet ten inches; height, forty feet six inches; breadth of the south aisle, twenty-two feet; height, forty feet; length of the south transept, fifty-six feet; breadth, forty-three feet six inches; height, eighty-six feet; length of the choir, one hundred and forty feet; breadth, thirty-four feet six inches; height, eighty-six feet; length of our Lady's chapel, ninety-two feet; breadth, twenty-four feet four inches; height, forty-six feet six inches; height of the tower, including the pinnacles, two hundred and twenty-five feet. The great chandeliers, which were completed by abbot Franecester, are the most elegant and perfect of the kind: the sides and roof are profusely embellished, and the windows are filled with multitudes and tracery.

This cathedral contains several curious specimens of monumental sculpture. On the tomb of Edward II., which was erected by his son and successor, and exhibits great perfection of art, is a recumbent figure, in alabaster, of the deceased monarch, regally robed and crowned. Another monument, worthy of notice, is that to the memory of alderman Black- leach, and his wife, whose figures, in white marble, lie on a table tomb, dated 1659, and from accurate copies of the portraits by Vandeyck; they are evidently the work of a skilful artist. A third, deserving observation for its design and chalice style, displays a group by Flaxman, erected to commemorate Mrs. Morley, who died at sea, in childbed; she is represented as rising from the waves with her infant in her arms, and conducted by two angels. Between the north aisle and the choir is a monument, erected by abbott Parker to perpetuate the memory of king Offie: and in a chapel nearly opposite, is a figure, supposed to represent the unfortunate Robert Curtois, duke of Normandy, and elder son of William the Conqueror.

The walls that surrounded Gloucester are mentioned in an ancient prophecy, attributed to Merlin; and tradition ascribes them to Cifta, the second king of the south Saxons. The Norman conqueror caused them to be strengthened and embattled; and they were again repaired in the nineteenth of Edward III. Leland describes Gloucester as "well-built of tymbre, and strongly defended with walls, where it is not fortified with the deepe streame of Sewen water." The walls were completely demolished under the Reformation; and the only memorial of their former strength now remaining is the Wilit Gate; this is embattled; and was erected in the time of Henry VIII. The castle, was probably built about the period of the Norman invasion; the remains were lately destroyed; and on its site was built the county gaol, which was completed in 1795; it consists of three divisions, respectively named the Penitentiary House, the Bridewell, and the Sheriff's Prison; these all have their distinct and appropriate regulations. The gaol contains 203 separate cells; 164 for seep, and 39 for employment.

In this city and its suburbs were formerly eleven parochial churches; but only six are now standing: those of St. Michael, St. Mary de Crypt, St. Nicholas, St. Mary de Lode, St. John, and St. Aldate; the others having been either destroyed at the siege in 1643, or since taken down. In St. Michael's church is a Blue Coat hospital, so called from the similarity of its regulations to those of Chrift Church, Lon- don, founded and endowed in 1666 by Sir Thomas Rich, bart. Among other benevolent establishments that confer honour on the inhabitants of Gloucester, may be mentioned the county infirmary, erected by voluntary contributions, and opened in the year 1775. Its annual receipts, arising from donations and the interest of funded property, amount to between two and three thousand pounds.

The principal trade of Gloucester results from the navigation of the Severn, from the hemp and flax-drefling busi- nesses, and from the pin manufacture. The latter, which is the principal source of labour to the inhabitants, appears to have been introduced into this city by John Tilley, in the year 1626, and is now carried on to a far greater extent than at any other place in England; there being nine manufactory, which furnish employment to about 1500 persons. The pins conveyed annually to the metropolis, are said to amount to the value of 42,000l; but the principal demand is from Spain and America. A bell-founding has been esta- blished here above three hundred years. The clothing trade, formerly the chief support of the inhabitants, is now nearly lost; one falling mill only remains.

Various and important privileges have been granted to Gloucester by several monarchs: it was erected into a borough by charter from king John; Henry II. granted the burgesses the fame liberties and customs as had been enjoyed by the citizens of London; by the act 33 Hen. VIII., which established the bishopric of Gloucester, it is ordered that the town should thenceforth be termed a city. It is also privileged as a county within itself. The corporation, acting under a charter of Charles II., consists of a mayor, twelve aldermen, a high sheriff, recorder, town clerk, two sheriffs, common-council, &c. The title of mayor first oc- curred in the year 1453. The high sheriffs have generally been persons of great eminence. Two representatives to parliament are elected by the inhabitants and freemen; the number of voters is about 3,000; the earliest return was made in the twenty-third year of Edward I. The elections are carried on in an ancient structure, called the Boff Hall, which is also appropriated to the alizes and other county busineses. The public affairs of the city are transacted at the Tholdey, a building supposed to have derived its name from the toll formerly received in it by the lords of the manor. Very considerable improvements have been made, within the last seventy years, in the appearance and buildings of this city. It consists, principally, of four spacious streets, meeting each other at right angles, and taking their names from the situation of the gate which originally stood at the bottom of each, as East Gate street, West Gate street, North Gate street, and South Gate street. At the inter- section of the streets, formerly stood a large and beautiful crofs; but falling to decay, and impeding the passage of carriages, it was removed in 1750; its site still retains the name. The city is well paved and lighted; and its elevated situation, with a gradual descent on every side, greatly contributes to health and cleanliness. The markets had long been established by preceptive right; but those now held, on Wednesdays and Saturdays, were chartered by Henry III. Three fairs are held annually and much frequented. The...
house and population have varied considerably in different ages, according to the degree of security or danger which the inhabitants experienced: the progress has been several times interrupted by fires and civil commotions. Since the siege in 1643, the increase has been regular. On the last enumeration, under the act of 1801, the houses, in the city alone, amounted to 1568, the population to 7255; the inhabitants of the suburbs being 1500 more. Gloucester is situated 106 miles W. from London.

Among the more eminent natives of this city is Robert of Gloucester, who wrote a chronicle of Britain in verse, from the age of Brutus to his own time, the reign of Henry III.

On the north-west side of Gloucester is the celebrated Site of Abbey, a small tract, formed by the separation of the stream of the Severn into two channels. This was the scene of a combat between Edmund Ironside and Canute the Dane, in the year 1016.

In the southern suburbs of Gloucester are the remains of St. John's priory, founded in 1187. After the dissolution, the monastic buildings were converted into the offices of a farm. The only parts now left are a large barn, and the principal entrance, or gateway; on which are the arms, among others, of the Bishops. earls of Hereford, who were great benefactors to the priory. Rudders History, &c. of Gloucester. Beauties of England and Wales, vol. v.

Gloucester and Berkeley, in the parliamentary county of Gloucester, are the names of several places in the county.

Gloucester, or Cape Ann, a township of America, in Essex county, Massachusetts, whose east coast forms the N. side of the bay of Massachusetts. It contains 3513 inhabitants, and is divided into five parishes, besides a society of Universalists. It is a post-town and a town of entry. The harbour is open and accessible to large ships, and is one of the most considerable fishing towns in the commonwealth. At the harbour, properly so called, are fitted out annually from 50 to 70 vessels, and from Squam and Sandy bay, two small harbours, the fishery is carried on with great facility, and to a large amount. Thatcher's island, on which are two lights, lies close to the S. E. side of the township, which is itself joined to the continent by a bank of sand, that is rarely overflowed with the water. Here is a fine white sand, fit for the manufacture of glues. The harbour is defended by a battery and citadel erected in 1795—16 miles N.E. by E. of Salem, and 34 N.E. of Boston.

Gloucester, the N. watermost township, and the largest, in Providence county, Rhode Island, being 111 miles square, containing 4359 inhabitants.

Gloucester, the name of a county in New Jersey, bounded N. by Burlington county, S. by Salem, Cumberland, and Cape May counties, E. by the Atlantic ocean, and W. by Delaware river. Its length on the Delaware is about thirty miles, and on the sea it is about 22 miles. Great and Little Egg Harbour rivers are both navigable for vessels of about 200 tons about 20 miles from their mouths. The streams which fall into Delaware river are navigable for small vessels, a few miles up from their mouths, and afford some fuel, roach, herrings, and perch. Its adjacent islands are Red Bank, Pett, and Old Man's creek. Two of the county is a mixture of sand and loam, and the tract bordering on the Delaware is in a high state of cultivation. The chief productions are beef, pork, fish, hay, corn, lumber, butter, cheese, &c. It is divided into ten townships, viz. Woodbury, Waterford, Newtown, Gloucester township, Gloucester town, Deptford, Greenwich, Woolwich, Egg harbour, and Galloway. Musicus river divides the county from Burlington, and is navigable 10 miles for vessels of 60 tons. Maurice river runs southerly about 40 miles through Cumberland county into Delaware bay, and is navigable for vessels of 100 tons 15 miles, and for halfhops 10 miles further. It contains 27,365 inhabitants, of whom 61 are slaves. In this county are found quantities of bog-iron ore, which is manufactured into pig, and bar iron, and hollow ware. Here is also a glass-house. The chief town is Woodbury, nine miles S. of Philadelphia.

Gloucester, a small town in the above-mentioned county, on the E. side of Delaware river, three miles below Philadelphia. Also, a poll-town in Virginia, in the county of its own name, on a point of land on the N. side of York river, 17 miles distant from York town.

Gloucester, a county in Virginia, fertile and well cultivated, bounded N. by Piankisunk river, which separates it from Middlesex, E. by Matthews county and Chesterfield bay, N.W. by King and Queen, S. and S.W. by York river, which divides it from York county. It is about 55 miles long and 30 broad, and contains 3727 free inhabitants, and 4999 slaves. The low lands produce excellent barley, and Indian corn, the staple produce of the county.

Gloucester Haff, a flatness belonging to the Hudson bay company, situated in New South Wales, on the N. side of the waters which form a communication through a chain of small lakes, between Winnipig lake and Albany river. Henley haff lies N.E. of this, nearer the mouth of Albany river in James's bay. N. lat. 54°. W. long 87° 30'.

Gloucester, a township in the county of Dundas in Upper Canada, which is the seventh in ascending the Ottawa river; E. of, and contiguous to, the river Rideau.

Gloucester, Cape, a cape on the S. coast of Terra del Fuego—also, a high promontory on the S. coast of New Holland. S. lat. 59°. E. long. 148° 11'. Also, a cape on the coast of New Britain. S. lat 5°. E. long. 148° 15'.'

Gloucester Island, an island in the S. Pacific ocean, about six miles long, and from one to a quarter of a mile broad, discovered and so called by captain Wallis in 1767. It is surrounded by rocks, full of trees, and inhabited by persons who appeared armed with long pikes or poles, but deftate of canoes. S. lat 10°. W. long 140° 3'.'

Gloucester, Duke of, Island, two islands in the S. Pacific ocean, discovered and so called by captain Carteret in 1767, which were covered with trees, but appeared to be uninhabited. The southermost of them was a slip of land in the form of a half-moon, low, flat, and sandy; the appearance of it was pleasant, but it had neither vegetables nor water; but it abounded with birds, so tame that they might be taken by the hand. The other island very much resembled this, and is distant from it about five or six leagues; they lie W.N.W. and S.E. of each other. One of them is in S. lat. 20° 38'. W. long. 146°; the other in S. lat. 20° 34'. W. long. 146° 13'; the variation 5° E. These islands are probably the land seen by Quiros, as the situation is nearly the same.

GLOUCESTERSHIRE, one of the western counties of England, is surrounded by Herefordshire, Oxfordshire, Berkshire, Wilts, Somersetshire, and Monmouthshire. It comprehends an area of nearly seventy miles in one direction, by forty in a transverse line. This district, during the Roman domination in Britain, was much occupied.
plied by the Romans. Mr. Folbrooke (one of the historians of the county) observes, "from the ruins which have at various times been excavated, it is evident that this county, from Cirencester to Painwick, Bifkey, Sapperton, Woodchester, Uley, Kingscote, and other adjoining places, was much peopled by Romans, or Romanized Britons; that Cirencester was the great metropolis, or resort of pleasure and amusement; while Gloucester, and the hills about the Severn, were the great military postures; the city, on account of the river, having peculiar advantages with respect to commerce." The principal Roman roads which passed through this county, were the Icenhill street, the Iving or Erming street, the Fosse-way, and the Vin John. Under the dominion of the Saxons, Gloucestershire formed part of the Mercian kingdom, and Winchcombe and Kingstanley are mentioned as refuges of the Anglo-Saxon monarchs. On the division of Mercia into five bishoprics, after the conversion of the Saxons, the greatest part of this country was included under that named Wiccia, and from this appellation the Dobuni, the early inhabitants of this part of Britain, were afterwards termed Wiccis. Gloucestershire is separated into four divisions; these are subdivided into twenty-eight hundreds, containing 320 parishes, one city, and twenty-eight market towns. The number of houses, as returned under the population act, amount to 37,176; of inhabitants, 187,164; of which 96,027 were males, and 90,997 females. The whole county, with the exception of the chapelry of Ichorn, and Cowhowby, is included within the diocese of Gloucester, which comprehends one arch-deaconry, and ten deaneries. The number of representatives returned to parliament are eight; two for the city, two for the county, and two for Cirencester. The general aspect of Gloucestershire is greatly diversified; nature having divided it into three districts of very different character, respectively named the Hill, the Vale, and the Forest. The Hill district, including the Cotswolds, and the Stroudwater hills, may be regarded as a continuation of the central chain proceeding south from Pembroke, and passing through this county with a smaller elevation into Wilts; there swelling into the Salisbury Downs, and afterwards running west towards the Land's End in Cornwall. The extent of the Cotswold hills, from Broadway hill to near Tetbury, is thirty miles; and from Birdlip hill to Burford, about twenty miles: the area they include is estimated, by Mr. Marshall, to contain nearly 200,000 acres. The surface is hilly; and the climate, confidering the natural elevation of the land, unusually mild. The sides of the hills abound with springs; and almost every dip has its well, and every valley its brook. The primary object of the Cotswold habitants is sheep; these have been long famous; and it is a prevailing tradition, that the Spaniards originally procured their breed of fine woollen sheep from these hills, though this asserion is contradicted by several modern writers. The inclosures are chiefly stone walls, about four feet and a half high, exclusive of a coping of flat stones. The Vale district includes the entire tract bounded on the east by the Cotswold hills, and by the river Severn on the west; and is, in a large part, divided into the Vales of Exwell and Gloucester, and the Vale of Berkeley; the latter of which is separated from the former by a natural interjection, and is very different in produce and rural management. The Forest district is separated from the rest of the county by the river Severn, and is principally comprehended by the Forest of Dean, which was formerly of particular value for the goodness and strength of its timber. Its oaks were so greatly renowned that Evelyn observes, that in Elizabeth's reign, an ambaflador was purposely sent from Spain to procure its destruction, either by negotiation or treachery. It also abounds in beech; and the soil is considered as peculiarly favourable for the growth of the Stile apple. Its principal minerals are iron, ore, and coal: iron appears to have been wrought here even in the time of the Romans; and so early as the reign of Edward I., seventy-two furnaces, for melting iron, are recorded to have been built here. In a survey made in the seventeenth year of Charles I., the forest is estimated as originally containing upwards of 43,000 acres, of which above 14,000 were woodland. Several thousand acres have, however, been granted away, by different sovereigns, and disafforested. The miners have different courts, and, like those of Derbyshire and Devonshire, are governed by their own customs.

The principal rivers connected with Gloucestershire, are the Severn, the Frome, the Wye, and the Isis or Thames. The canals that intersect the county are distinguished by the names of the Thames and Severn, the Stroudwater, the Berkeley, and the Hereford and Gloucester. The Severn, the second commercial river in England, renders essential service to a large portion of this county. It enters Gloucestershire near the ancient town of Tewkesbury, where, uniting its waters with the Upper Avon, and pursu-ing a south-westerly course, it traverses a wide vale, which is rich in palmage, and in some places abundantly wooded. About one mile above Gloucester, 10 divides into two streams: these again unite a little below the city, forming the tract of land called Abbey island. In the course of its passage through the county, it receives the streams of the Upper Avon, the Chelt near Wainслоe, the Leden near Over'sbridge, the Frome at Framilode, the Avon at Berkeley, and the Lower Avon below Bristol. The Wye separates part of this county from Monmouthshire and Herefordshire, and forms the grand natural western boundary to the forest of Dean, whose noble wooded eminences constitute many fine features on its meandering banks. The Thames, the most important of the British rivers, has its source in this county, at a place called the Thames-head, near the village of Cotes, about two miles south-west of Cirencester. Near this place the Thames and Severn canal emerges from under ground, and receives a considerable quantity of water, occasionally from this spring. The junction of the Thames and Severn was an object of favourite speculation with the London and Bristol merchants for many generations; but not completely formed till the close of the sixteenth century, after that project was obtained in 1735, and the design was brought to perfection in 1792, when the first vessel passed from the Severn into the Thames. This canal begins at Wallbridge, near Stroud, (at the place where the Stroud navigation ends,) and proceeds in a deviuous course through the county to Lechlade, where it joins the Thames. This course includes a distance of thirty miles, seven chains and a half. The water, in its progress from Stroud to Sapperton, (seven miles three furlongs,) is raised by means of locks 241 feet 3 inches; between Sapperton and Lechlade it falls 135 feet 6 inches. The Stroudwater canal encounters many obstructions; yet in defiance of all opposition, an act was obtained in 1773, under the operation of which it was finished.

The manufactures of Gloucestershire are numerous: clothing fluffs, blankets, rugs, rugs, carpets, stockings, &c. are made in different parts of the county. Bat, iron, edge tools, herring, and many other articles, are also manufactured in large quantities. Near Bristol are some extensive foundries; as well as different works for making brass and wire, vitrili, red-lead, sal-ammoniac, &c. At Gloucester, vast quantities of pins are made; and at Frampton-Cotterell is a considerable

GLOVE, CHLOTHICA, a habit or covering for the hand and wrist, used both for warmth, decency, and as a shelter from the weather.

Gloves are distinguished, with respect to commerce, into leather gloves, silk gloves, thread gloves, cotton gloves, worsted gloves, &c.

There are also gloves of velvet, satin, taffety, &c. Leather gloves are made of shawm, kid, lamb, doe, elk, buff, &c. There are also perfumed gloves; washed, glazed, waxed gloves; and white, black, saff'nt-colour, &c. gloves; single, lined, topped, laced, fringed with gold, silver, silk, fur, &c.

It is a proverb for a glove to be good and well made, three kingdoms must contribute to it; Spain to drefs the leather, France to cut it, and England to sew it. But, of late, the French seem to have appropriated the functions of the other two; the gloves of the French manufacture being now said to have the advantage, in point of dressing and sewing, as much as of cutting.

By 34 Geo. III. c. 19. the British duty on gloves and mittens imposed by 25 Geo. III. c. 55. is repealed, except the duty on laces; and by 36 Geo. III. c. 80. the said duty on licences is also repealed. By 6 Geo. III. c. 19. and 25 Geo. III. c. 55. foreign manufactory leather gloves or mitts shall not be imported, under the penalty of forfeiture; and the importer or seller incur, besides forfeiture, a penalty of 200l. with double costs.

GLOVE, to throw the, was a practice or ceremony very usual among our forefathers, being the challenge whereby another was defied to single combat. It is still retained at the coronation of our kings, when the king's champion calls his glove in Westminster-hall.

Fawyn supposes the custom to have arisen from the eastern nations, who, in all their fables and deliveries of lands, goods, &c. used to give the purchaser their glove by way of livery or investiture. To this effect he quotes Ruth iv. 7 where the Chaldean paraphrase calls glove what the common version renders by thole. He adds, that the rabbins interpret by glove, that passage in the 34th Psalm, "In Thine abundant calmecatum nunc, over Edem will I call out my thole." Accordingly, among us, he who took up the glove, declared thereby his acceptance of the challenge; and as part of the ceremony, continues Fawyn, took the glove off his own right hand, and call it upon the ground, to be taken up by the challenger. This has the force of a mutual engagement on each side to meet at the time and place which should be appointed by the king, parliament, or judges.

The same author affirms, that the custom which obtained of blessing gloves, in the coronation of the kings of France, is a remain of the eastern practice of giving investiture with the glove, Lib. vi. p. 1817, &c.

The delivery of a glove was in frequent use formerly, as a symbol of investiture. See Du Cange, Gloss. Lat.

Gloves were also used to signify the reward or halfpenny, or part of the price of the investiture or purchase-money of the land. "Si aliquam territortiam partem venundarii contigerit, domini venditiones habebant; sefticis, tot denarios quot venditor inde habuerit folidos. Major vero terra illius pro quius occuparent duos donarios." Where quidem significant gloves, or, in French, gants.

Hence the common custom, in many bargains, of givingervants money for a pair of gloves.

Anciently it was prohibited the judges to wear gloves on the bench; and at present, in the tables of most princes, it is not safe going in without pulling off the gloves.

GLOVER, Richard, in Biography, was born at London in 1712. He received the elementary instructions in classical learning at Cheam, and exhibited a considerable taste for the classics, and an attachment to science. When he was only 16 years old, he wrote a copy of verses "To the memory of Sir Isaac Newton," which is prefixed to Dr. Pemberton's view of the Newtonian philosophy. He engaged in commercial pursuits, and became eminent in the mercantile world, to which he was introduced by his father. In 1737, he married a lady with a handsome fortune; and in the same year he published his epic poem of Leonidas. Glover had joined the opposition of the day, at the head of which was Frederic prince of Wales, and his poem, founded on the struggles of free Greece against Asiatic despotism, was calculated in a high degree to serve a generous cause. It abounds in noble sentiments, and is considerably varied by incident and description. Its plan is admirably adapted for poetical effect: it was received by Lyttleton and others with high applause, and very soon passed through three editions. "But it labours," says the critic, "under that want of interest which attends all modern epics, especially such as are built upon some of the sublimer events of ancient history; and its poetry is not of a character sufficiently elevated to engage the reader by the beauty of detached passages." The reputation which it first acquired soon subsided, and it now lives rather in memory than in the actual acquaintance of readers. He published in 1739, his poem, entitled "London, or the Progress of Commerce;" and the ballad of "Fofier's Ghost." Mr. Glover was not only a poet but an ardent politician, and was distinguished in various infinities for his eloquence in the caufe of freedom.

His talents gained him great credit, and he was appointed by the merchants of London to conduct an application to parliament, complaining of the neglect with which their trade had been treated. The speech which he pronounced at the bar of the house of commons on this subject, in January 1742, was greatly admired, and was published. His celebrity as a public character, did not favour his progress in commerce; his affairs became embarrassed; he was, to use a modern fashionable phrase, obliged to suspend his payments, and at length retreated from active life, to practice economy in an obscure situation. The duchess of Marlborough bequathed him, and Mallet, five hundred pounds each on condition of their joining to write the history of the great duke. Glover renounced the task, and Mallet never executed it. He now wrote several pieces for the stage, which being successful to a considerable degree his circumstances became so much improved, that he ventured to return to public life, and fat as member for Weymouth, in the parliament of 1761. His commercial knowledge made him extremely useful on several important occasions. In the year 1775, he took an active part in an application to parliament on behalf of the West India merchants, and for his zeal and fidelity he was complimented with a valuable present of plate. He died in November
November 1785, and left behind him another poem, entitled
the "Athenaids," relating, in thirty books, the wars between
the Greeks and Persians. This was published in 1788, in
three volumes 12mo., but it failed completely in attracting
public attention.

GLOVER, in Geography, a township of America, in the
state of Vermont and county of Orleans, N. E. of Crafts-
borough, adjoining. It has 36 inhabitants.

GLOVER'S Reef, rocks on the bay of Honduras. N. lat.
16° W. long. 88° 26'.

GLOW-worm, in Entomology. See Cicindela. Can-
tharis and Cicindela have been often used, indiscriminately,
for the glow-worm; but they form two distinct genera of
the same order in the Linnaean system. See Cantharis.
The glow-worm is often seen in the day time.
The male and female differ greatly in this species of insect.
The male has wings, and is a small fly; the female has no
wings, but is a large crawling worm.
The body of the male is oblong, and somewhat flattened;
the wings are shorter than the body; the head is broad, dun,
and flat; the eyes are large and black. This has no light
sufficing from it, and is not commonly appooped to be at all
of kin to the glow-worm.
The female is what we expressly call by this name; this
is a very flow-paced animal, without wings, and somewhat
resembling a caterpillar; the head is small, flat, hard, and
black, and sharp towards the mouth; it has short antenna;
and fix moderately long legs; the body is flat, and is com-
posed of twelve rings, whereas the body of the male consists
only of five; it is of a dusky colour, with a streak of white
down the back. It is often seen in the day-time, but it is
not known except in the dark; at which time it is easily
distinguished by the glowing light, or lommert flame, that is
seen near the tail, sufficing from the under part of the
body.
The common glow-worm is frequently met with under
our hedges, and, if carefully taken up, may be kept alive
many days on fresh tufts of grass; all which time it will
continue to shine in the dark.
The light of this little insect is so strong, that it will inflow
itself through several sublimates, in which the creature may
be put up; a thin pellio coarsely shews it through, and even
when lined with paper, the light is not impeded in its
passage by both. The creature is sluggish, and appears
dead in the day-time, and its light is not distinguishable;
even if carried into a darkened room, unless the creature be
turned upon its back, and disturbed, so as to be put in
motion, and then it is but faint; after fun the light
begins to return, and with it the light and motion of the
animal. The motion and light of this creature sjeem, in
some measure, to depend upon one another: it never shews
but when the body is in some sort of motion; and when it
shines most, the body is extended to one-third more than its
length in the day-time. In the time of brightest shining,
it will sometimes on a sudden turn its body about, and the
light will not be larger than the head of a pin; and, on
being touched, it will then immediately extend itself, and
the light will become as large and bright as ever. Phil.
Trans. N. 71.

Two points seem to be agreed upon by naturalists, with
regard to the light sufficing from the tail of a glow-worm;
that it is phosphoric, and secondly, that its use is to
to attract the male insect. Should the singularity, if any
such there be, in the natural history of this animal, which
should render a provision of this kind more necessary for the
glow-worm, than for other insects, be a subject of inquiry;
it may be observed that this singularity seems to be the
difference, which subflects between the male and the female,
which difference is greater than what is found in any other
species of animal whatever. The glow-worm, as we have
observed, is a female caterpillar, the male of which is a fly;
likely, comparatively small, dissimilar to the female in ap-
pearance, probably also as differing from her in habits,
purposes, and manners, as he is unlike in form and external
constitution. Hence it appears, that the caterpillar cannot
meet her companion in the air. The winged rover disdains
the ground. They might never therefore be brought to-
tgether, did not this radiant torch direct the volatile mate to
his sedentary female.

"In this example," says the ingenious author now cited,
"we see the resources of art anticipated. One grand opera-
tion of chemistry is the making of phosphorous; and it was
thought an ingenious device, to make phosphoric matches
supply the place of lighted tapers. Now this very thing is
done in the body of the glow-worm. The phosphoric is not
only made, but kindled; and caused to emit a steady and
powerful beam, for the purpose which is here stated, and which
I believe to be the true one." Paley's Natural Theology,
p. 353.

Glow-worm, Flying, cicindela volans. In the warmer
months of the year, this creature is sometimes caught in our
housetops flying to the flame of a candle, and when examined
in the dark, it is found luminous at these times, though
perhaps less, or not at all so, at others; which may be a
reason of its not being known, though caught in the fields;
and to this it may be owing, that many who have described
it have thought it not a native of England. Without wings
it is frequently enough found in form of the common glow-
worm, and then always flies. Aldrovand has very well
described the cicindela volans, and says, that it lays eggs,
which hatch into small worms, and that these after a time
become flies, by the same fort of change which happens to
caterpillars and other reptiles which become butterflies,
and other species of winged insects. Monfett, and Thomas
Bartholomew, both describe the animal much as Aldrovand
has done, but they allow the male only to have wings; but
Julius Scaliger contradicts this, and says, that he has caught
them both winged in the act of generation: this is a plain
proof that both sexes are winged; yet it has not happened
that both sexes have been acknowledged to be so, even by
those who have quoted this passage. And Mr. Walker,
who gives an account of them in the Philosophical Trans-
actions, offered them in the same manner in the act of
copulation both winged, and with no other difference be-
tween them but that the female was the larger of the two,
which is the case in regard to many insects. Julius Scalig.

The male and female in this winged forme both shine in
hot weather, and their light is so vivid as to be easily seen
while there is a candle in the room; the vibrations of it are
irregular and its colour greenish. The luminous parts are
two small specks under the tail at the end, and the light continues
in these same time after the tail is cut off, but then gradually
goes out.
The parts of insects continue alive in some degree for a
considerable time after they are cut off, and probably the light
in the tail of this animal continues just as long as that fort
of life remains in it. Monfett. Cap. 15.
The use of this light seems to be to direct the animal in its
course, and in the taking of its prey, and to this purpose it
is admirably placed. The tail is easily bent under the belly;
then throws the light full upon any object about or under
the head of the animal, and the eyes are placed not on the upper
part but on the under side of the head; so that they have
all
all the advantages of it, while the light in this part is not offensive to the eyes, as it naturally would have been if carried before the head. The creature can, upon occasion, cover this light, so as not to be known, or purposed by it, by its enemies. Thomas Barthol. de Luce Anim. lib. ii. cap. 12.

This insect is of the beetle kind, of a brown and dusky colour. It has hard case or shell wings, as the other beetles have, and when these are expanded, there appear a pair of very large membranous ones; its head is covered with a sort of shield or broad-brimmed hat: under this hat are placed the eyes, which are black and large, and are movable, so that the creature can, upon occasion, thrust them forward: it has two hairy antennae, and its legs are like those of the common fly, hard, fuzzy, and hairy. Its eyes afford an elegant object for the microscope, being composed of an infinite number of lenses, as those of the lichelle and other insects. Aldrovand. de Insect. lib. i. cap. 8.


Gen. Ch. Cal. Perianth superior, of five oblong, spreading, nearly equal leaves. Cor. of one petal, obliquely bell-shaped; gibbous at the base; its border in five round-obtuse lobes, the four uppermost recurved, the lower one prominent, concave and inflexed. Stam. Filaments four, much shorter than the corolla, with the rudiment of a fifth; inserted into the receptacle, connected with the base of the corolla, incurved, downy, converging laterally in the upper part, two of them rather the short; anthers ovate, peltate, two-celled, cohering together, their lobes diverging. Pyl. Germen inferior, turbinate, furrowed; style cylindrical, as long as the fructification, stigma capitate. Peric. Capsule imperfectly, two-celled, with two valves, and two lateral divided receptacles. Seeds numerous. Juff.

Ef. Ch. Calyx superior, of five leaves. Corolla bell-shaped, with an oblique irregular border. Filaments, with the rudiment of a fifth, inserted into the receptacle. Capsule bell-shaped, with many seeds, inserted into lateral receptacles.

1 G. maculata. Curt. Mag. t. 1191. (Martynia perennis; Linn. Sp. Pl. 862. Hort. Chiff. t. 18. Ehret. Dict. t. 9. f. 2. Mart. Mill. Dict. v. 3.—Native of South America; the seeds having been sent from Carthage by Mr. Robert Millar, before 1739. It requires with us the cool heat of a hard flow, by means of which it flowers late in autumn. It is propagated abundantly by the little tuberous roots, which are perennial. The stem is herbaceous, simple, leafy, round, very smooth, spotted with purple. Leaves large, ovate, recurved, flaked, broad-ovate, acute, serrated, smooth and shining, pale at the back, with prominent veins. Flowers axillary from the diminished leaves, or bractes, at the upper part of the stem, solitary, flaked, large, drooping, of a fine blue with a dark spot at the bottom within. Their scent is very peculiar, resembling mint, which no writer seems to have noticed.
GLUCK.

The music of France had reached a high point when Gluck arrived. His friends feared its fierce onslaught, but there was much melody and always movement, in the music, though it was full of new and ingenious passages and effects; he would like much to hear this air well performed at the opera; it is kept alive from beginning to end. Something might be expected from a young man able to produce this opera, imperfect as it was. It had, however, but five representations.

From London he returned to Italy, and composed several operas in the style of the times, such as that of Terradellas, Galuppi, and Jomelli; and he heard little of him till he embarked with the Italian poet Calzabigi, with whom he joined in a conspiracy against the poetry and music of the melodrama then in vogue in Italy and all over Europe.

It is extraordiary that Calzabigi, editor of the beautiful Paris edition of the works of Metastasio in 1755, in the preface to which there is the highest and seemingly mild cordial praise of the works of the imperial laureate, should be the first, ten years after, to find them so defective; writing his "Orfeo" in a different style, and joining with Gluck in decriing the lyrical style both of the music and poetry of the Italian opera.

In 1764, the year in which the late emperor Joseph was crowned king of the Romans, Gluck was the composer, and Guadagni the principal singer. It was in this year that a species of dramatic music, different from that which then reigned in Italy, was attempted by Gluck in his famous opera of "Orfeo," which, with Guadagni's admirable action, succeeded so well, that it was soon after attempted in other parts of Europe, particularly at Paris and Berlin. This is not the place to discuss its merit; we shall here only observe, that the simplifying dramatic music in Gluck's manner, in favour of the poet, at the expense of the composer and singer, is certainly very rational, where an opera is performed in the language of the country, and the singers have no great abilities to display, as in France; but in England, where we have frequently fingers of uncommon talents, and where so small a part of an opera audience understands Italian, by abbreviating the symphonies, and prohibiting divisions and final cadences, in favour of an unintelligible drama, we should lose more than we should gain.

After its successes at Parma and Paris, "Orfeo" was exhibited at Bologna, Naples, and in 1770 in London; where the principal parts were filled by Guadagni and Grafix, after-warly very popular.

The unity, simplicity, and new dramatic excellence, which at Vienna, and afterwards at Paris, rendered this drama so interesting as to make the audience think more of the poet than the composer, were greatly diminished here, by the heterogeneous mixture of music of other composers in a totally different style.

In 1769, Calzabigi and Gluck, encouraged by the successes of "Orfeo," produced "Alcaide," a second opera, on the reforming plan, at Vienna, which received even more applause than the first. In 1771, the same poet and musician brought a third opera, "Paride ed Elena," on the stage at Vienna, written and composed in the same new, or rather old, French style, with better music, in which Mellico was the principal singer, and which afforded the audience such pleasure as seemed to have impressed the lovers of music in the imperial capital with a partiality for that species of dramatic music, which was not likely to be soon obliterated.

In 1772, Gluck let to music an opera taken from Racine's "Iphigenia," in which he so far accommodated himself to the national taste and style of France, as frequently to imitate and adopt them. And as this opera was intended for Paris, his friends feared for its success, as there was frequently melody, and always movement, in his music, though set to French words, and for a serious French opera.

But the year 1774 was rendered remarkable in the annals of French music, by the arrival of the chevalier Gluck at Paris, whose operas, by his conforming to the genius of the French language, and flattering the ancient national feeling, were received with acclamation. He began his career in this capital by his celebrated opera of "Orphée," of which the reputation was already established; and this was followed by "Iphigenia," taken from one of Racine's best tragedies, which had all the success that may be imagined from the force of his genius applied to a favourite drama, set in the style of their favourite composers, Lulli and Rameau.

In his opera of "Cycthe Asphodes," 1775, where more delicacy and tenderness, than force, were required in the composition, he was not so successful. Nor was his "Alembe," the year following, received with the same rapture as at Vienna. Indeed his "Armide," in 1775, did not quite fulfil the ideas of grace, tenderness, and pathos, which some of the scenes required, and auditors accustomed to Italian music expected; however, his operas were excellent preparations for a better style of composition than the French had been used to; as the recitatives were more rapid and the airs more marked, than in Lulli and Rameau; the airs were likewise more voluntary in their beginning, and infinitely more force and effect in his expression of grief, remorse, vengeance, and all the violent passions.

Gluck's music is so truly dramatic, that the airs and scenes, which have the greatest effect on the stage, are cold, or rude, in a concert. The situation, context, and interest, gradually existing in the audience, give them their force and energy.

Indeed, he seems so much the national musician of France, that since the best days of Rameau, no dramatic composer has excited to such enthusiasm, or had his pieces so frequently performed. It has been said in the "Journal de Paris," that each of his pieces had supported two or three hundred representations. The French, who feel very enthusiastically whatever music they like, heard with great rapture the operas of Gluck, which even the enemies of his genre allowed to have great merit of a certain kind; but though there is much real genius and intrinsic worth in the dramatic compositions of this master, the congeniality of his style with that of their old national favourite and Rameau was not unmixed with the friends of that music. The almost universal cry at Paris was now, that he had recovered the dramatic music of the ancient Greeks; that there was no other worth hearing; that he was the only musician in Europe who knew how to express the passions; those and other encomiums preparatory to his apotheosis, were uttered and published in the journals and newspapers of Paris, accompanied with conflabulations and contemplative cenuses of Italian music, when Piccini arrived. This admirable composer, the delight and pride of Naples, as Gluck of Vienna, had no sooner erected his standard in France, than all the friends of Italian music, of Rondeau's doctrines, and the plan, if not the language, of Metastasio's dramas, enlivened in his service. A furious war broke out; all Paris was on the qui vive; no door was opened to a visitor, without this question being asked previous to his admission: "Monseigneur, cherchez-vous Piccini ou Gluckart?" These disputes, and those of musical critics, and rival artists throughout the kingdom, seem to us to have fumed and diminished the pleasure arising from music in proportion as the art has advanced to perfection. When every phrase or passage in a musical composition is to be analyzed and dissected during performance, all delight and enthusiasm are extinguished.
enthusiasm vanish, and the whole becomes a piece of cold mechanism. It is certainly necessary for professors to study care and effect, and to make themselves well acquainted with the fundamental rules of their art; but we would advise true lovers of music to listen more than talk, and give way to their feelings, nor lose the pleasure which melody, harmony, and expression ought to give, in idle enquiries into the nature and accuracy of their auricular sensation.

The cavalier Gluck, after returning to Vienna from Paris, and being rendered incapable of writing by a paralytic stroke in 1784, only lingered in a debilitated state till the autumn of 1787, when he died at the age of seventy-three.

Gluck had great merit as a bold, daring, nervous composer; and as such, in his French operas, he was unrivalled. But he was not so universal as to be exclusively admired and praised at the expense of all other composers ancient and modern. His style was peculiarly convenient to France, where there were no good singers, and where no good singing was expected or understood by the public in general; and where the poetry was set up against music, without allowing equality, or even an opportunity of manifesting her most captivating vocal powers.

It is, however, allowed by an exclusive admirer of Gluck, in the Encyc. Meth., that "the Italians have the glory of having furnished examples of almost every kind of beauty of which music is susceptible, and of having disseminated their taste in every part of Europe;" but adds, that "France will owe to the celebrated Gluck the having first conceived the system of a music truly dramatic, and our theatre will furnish true models of it to other nations, and to posterity. Let us be content to dwell from the Italians and the Germans the glory of laying the true foundation of a musical system and of transforming the most amiable and touching of arts, into a science as intertesting as it is fertile."

Gluck, in a moment of "frantage," over a bottle, said: "The French are a very good sort of people, who love music, and what songs in their operas; but they have no fingers." And Scribe, being asked how his operas were executed at Paris, said, "God forbid I should ever go to hear them performed!" And there are the people who are to furnish models of dramatic music to Italy, and to all the rest of Europe!

GLUCKSBURG, in Geography, a town of Denmark, with a fortress, in the district of Skelwick; nine miles E. of Flensburg.

GLUCKSTADT, a sea-port town of Germany, in the kingdom of Holstein, belonging to Denmark, situated on the Elbe. This town is regular and well-built, and its market place commands the chief streets. Several canals run through it, and the principal one crosses near the market place, and is here connected with another, which divides the town into two nearly equal parts. On the land side it may be laid under water. Gluckstadt is the feast of the king's regency, and of the offices and courts connected with it. Here is also a grammar-school. The Calvinists are permitted to have a church, the Roman Catholics a chapel, and the Jews a synagogue. In 1738 a commercial college was instituted here by king Christian VI., as it was a place of some trade; and in 1750, king Frederic V. established an office for keeping the harbour, adjoining to which is a basin for the reception of vessels, in good condition. Gluckstadt was built in 1620 by permission of Christian IV. in a walled town called the Wildenreis, and in the patent granted to it, he ordered that it should be called Gluckstadt, or the Fortunate Town; he also conferred upon it many customs, rights, and privileges, such as were enjoyed by the town of Wilt: and it was soon after invested with the Lubeck and Hamburg rights. It is distant 28 miles N.W. from Hamburgh. N.lat. 53° 51'. E. long. 9° 20'.

GLUE, Glue has a number of uses, tenacious matter, serving as a cement to bind or connect divers things together.

There are divers kinds of glues made use of in the divers arts; as the common glue, glue glue, parchment glue; but the two last are more properly called fes.

The common or strong glue is a commodity used by numerous kinds of artificers; as joiners, cabinet-makers, cafe-makers, hatters, book-binders, &c. and the consumption thereof is very considerable. The bill is made in England, in square pieces of a ruddy brown colour: Flanders glue, which is whiter and transparent, is held the next after the English. The most ordinary glue of France is black and opaque.

Glue is made of the skins of all kinds of beasts; as oxen, cows, calves, sheep, &c. The older the beast is, the better is the glue that is made of its hide. Indeed, it is rare they use whole skins for this purpose; those being capable of being applied to better purpose; but they make use of the shavings, parings, or scraps of the hides, and also horns; and sometimes they make it of the feet, haws, nerves, &c. of birds; and also of the pelts obtained from furriers.

That made of whole skins is the best, and that of fowees, &c. the worst; and hence, chiefly, arises the difference of glues, and the advantage of English and Flemish glues.

GLUE, method of making.—Mr. Clesnel, in the Monthly Magazine for 1802, gives the following statement of the general mode of its manufacture. The materials above enumerated are "first digested in lime-water, to cleanse them from grease or dirt; they are then steeped in clean water with frequent stiring, and afterwards laid in a heap and the water pressed out. They are then boiled in a large brass cauldron with clean water, scumming off the dirt as it rises, and it is further cleansed by putting in, after the whole is dissolved, a little melted alum or lime finely powdered. The scumming is continued for some time, after which the mass is strained through baskets, and suffered to settle, that the remaining impurities may subside. It is then poured gradually into the kettle again, and further evaporated by boiling and scumming, till it becomes of a clear dark brownish colour. When it is thought to be flxing enough, it is poured into frames or moulds about six feet long, one broad, and two deep, where it gradually hardens as it cools, and is cut out when cold by a spade into square cakes. Each of these is placed in a fort of wooden box open in three divisions to the back; in this glue, while yet foid, is cut into three slices, by an instrument like a bow, with a brafs wire for its string. These slices are then taken out into the open air, and dried on a kind of coarse net-work, fastened in movable heds four feet square, which are placed in rows in the glue maker's field. When perfectly dry and hard it is fit for sale. That is thought to be the best glue which swells considerably without melting by three or four days' immersion in cold water, and recovers its former dimensions and properties by drying. Glue that has got froth, or that looks thick and black, should be melted over again. To know good from bad glue, the purchaser should hold it between his eye and the light, and if it appears of a strong dark colour, and free from cloudy and black spots, the article is good. When glue is used by the carpenters, they break it and soak it for about 24 hours in cold water; and then melt the leaked pieces, causing it to simmer for a quarter of an hour over a slow fire and frequently stiring it. When cooled it becomes a firm jelly, which may be cut by any instrument. It is merely warmed for use, and in this state spread over the surface of the wood with a flat brush. In an interval from one
one to three days the pieces of wood will be so perfectly coagulated, that boards, thus coagulated, will as readily break in any part as separate at the juncture. Glued boards will not set in a freezing temperature; the stiffening being occasioned by the evaporation of the superfluous matter of the glue, which is prevented by a considerable degree of cold.

GLUE, Bee. See WAX.

GLUE, Fjib, is a sort of glue made of the nervous and mucilaginous parts of a large fish, found chiefly in the Russian seas. These parts, being boiled, bear a near resemblance to that viscid matter found on the skins of cod-fish. When boiled to the consistency of a jelly, they spread it on a leaf of paper, and form it into cakes; in which state it is sent to us.

Fish-glue is of considerable use in medicine, and divers others arts; where it is better known under the name of flinglafs and ichthyocolla. See IINGLASS.

A strong and fine glue may be prepared with flinglafs and spirit of wine thus: Keep the flinglafs for twenty-four hours in spirit of wine or common brandy. When the mezelrum has evaporated and clarified the flinglafs, they must be gently boiled together, and kept simmering till they appear well mixed, and till a drop thereof, suffered to cool, presently turns to a strong jelly. Then strain it, while hot, through a clean linen cloth, into a vessel to be kept close stoped. A gentle heat suffices to dissolve this glue into a transparent and almost colourless fluid, but very strong; so that pieces of wood, glued together with it, will separate elsewhere than in the parts joined. Boyle’s Works abridg. vol i. p. 150.

A strong compound glue may be made by infusing a mixture of common glue, in small pieces, with flinglafs glue, in as much spirit of wine as will cover them, for about twenty-four hours; then melt the whole together, and add as much powdered chalk as will make it an opaque white.

A strong glue, that will retain moisture, may be obtained by dissolving gum sandarac and mastic, of each two ounces, in a pint of spirit of wine, and adding about an ounce of clear turpentine; then take equal parts of flinglafs and parchement glue, and having pounded them into small pieces, pour the solution of the gums upon them, and mix the entire mixture in a covered vessel, with a heat less than that of boiling water: then strain the glue through a coarse linen cloth, and putting it again over the fire, add about an ounce of powdered glafs.

Or, a strong glue, that will retain water, may be made by adding half a pound of common flinglafs glue to two quarts of skimmed milk, and evaporating the mixture to a due consistence.

A glue, that will hold against fire and water, may be made by mixing a handful of quicklime with four ounces of limed oil, boiling them to a good thicknes, and spreading the mixture on tin plates in the shade; it will thus become exceeding hard, but will easily be dissolved over a fire, and be fit for use. See CEMENT.

GLUMA, a Hugh, in Botany, is the peculiar calyx of grasses and grass-like plants, and indeed their corolla, at least what is so termed by Linnaeus, is of the same chaffy nature. Huks or Glumae are usually comprized, embracing each other at the base; more rarely they are deprefsed, flattened vertically, as i Quaking-gras or Briza. To the hulk belongs the arill or arm, (see ARIST) which is a brittle-shaped appendix, usually spiral, and possessing the properties of an hygrometer. It originates from the midrib or keel of the hulk, and is either terminal or doralf, being in the latter case placed sometimes very far down the back of the hulk, as in many species of Avena, and in these instances it belongs to the glumes that constitute the corolla, not the calyx. The arillæ, though so remarkable, is by no means always constant in the same species, though nearly invariably so in the flowers of the same individual plant.

Huks are mostly furnished with one central longitudinal rib, though the inner glume of the corolla in grasses have two nearly marginal ones. They have in most instances, besides the central rib, a greater or less number of lateral ones, all likewise longitudinal, of great use in distinguishing species of Poa and other difficult genera. Their margin is commonly thin and more or less membranous or fesride. Some glume always remain separate and distinct from the seed which they commonly unfold; others are closely incorporated with that part as it ripens, of which a curious example may be seen in Briza.

Some sorts of viviparous grasses exemplify the transformation of glumes into leaves in a remarkable manner, the awn remaining at the summit being perhaps the only indication of their original nature. See Airo Lirigata, Engl. Dict. 2132. The same metamorphosis of a petal into a leaf is indeed not rarely seen in a Tulip and other cultivated flowers. We have a wild species of a similar change in Arranum alpina, part of whole leafy involucrum is become a perfect petal.

Glumes are, we believe, invariably permanent, never deciduous, till the seed ripens, when those of the corolla fall off along with the seed, serving the purpose of a pericarpium.

GLUMACEOUS FLOWERS, a term applied by some botanists to the flowers of the natural order of grasses, expressive of their chaffy nature.

GLUMMEN, in Geography, a town of Prussia, in the province of Natangien; 24 miles S. of Königsberg.

GLURANTZ, or GLUES, a town of the county of Tyrol, situated on the river Adige, built in 1562, and surrounded with walls in 1530. It was taken by the French in 1799: 36 miles W. of Brixen. N. lat. 45° 38'. E. long. 10° 26'.

GLUS, in Surgery, a species of dysuria, attended with a copious quantity of mucus in the bladder. Hence, the malady has been named dysuria mucosa.

GLUT, among Fowlers, the fliny substance that lies in a hawk’s pouch.

GLUE, in Rural Economy, a term sometimes provincially applied to a large wooden wedge.

GLUTA, in Botany, so called by Linnaeus, from the Latin word glutus, thrust close together, in allusion to the close application of the claws of the petals to the stalk which elevates the organs of fructification. Professor Martyn seems not to have been aware of this derivation. We are led to it by the repeated indication of the circumstance in Linnaeus, and his use of the word adglutinata, even in the generic character, as well as in his subsequent observations. Linna. Mant. t. 2. 160. Syll. Veg. Ed. 14. 821. Schreb. 1:25. Willd. Sp. Pl. v. 1. 1120. Mart. Mill. Dict. v. 2. Jull. 427. Clas and order, Pentandria Monogynae. (Linnaus refers it to Gynandra Pentandria.) Nat. Ord. Capparidae, Jull.

Gen. Ch. Cal. Perianth inferior, of one leaf, membranous, bell-shaped, obtuse at the base, cloven half way down into two lobes, deciduous. Cor. Petals five, equal, lanceolate, bluish, somewhat oblique, four times the length of the calyx; their upper part spreading horizontally; their claws cohering round the stalk of the germen, and attached to it. Stam. Filaments five, bristle-shaped, rather shorter than the petals, inserted into the summit of the stalk of the germen; authors various, rather oblong. Pfiff. Germen 3 B 2 obovate,
GLO

above), standing on a cylindrical stalk, which is rather longer than the calyx; style thread-shaped, equal to the filaments; stigma simple, obtuse. Peric. and Stells unknown.

Of Ch. Calyx bell-shaped, cloven, deciduous. Petals five; their claws coiling round the stalk of the germin. Stamens inserted into the top of that stalk, of the germin.

1. G. Benghaii. Linn. Mant. 2. 292. Native of Java, where it is called Bengha, and if we mistake not, in the Malay language Dodee. This plant is unknown to all botanists except Linnaeus, by whose herbarium alone it can be determined. His remarks have led the fludants of natural orders wide of the truth concerning it, for nothing can be more like the solla. To Sterculia it has some resemblance, and we have been much inclined to refer it to Judieen's Malvaceae, especially from its likeness in some respects to the Affania of that author and of Cavanilles; but on examination this likeness proves fallacious. The most probable place for it is among or near the Capparidaceae, but the fruit being unknown, leaves this matter in great doubt. After all, it may be thought to belong to some near order, which the fludants of natural arrangement are but too prone to make on every emergency, and the French in particular seem to think they drew their skill by their reminiscences on this head, whereas it is but an easier fault, though a more fatal one, than that of making too many genera, and ought to be watched with tenfold care.

The Glaea Benghai appears to be a frond or tree, with slightly pubescent branches and buds. Leaves scattered, most numerous about the ends of the branches, from three to ten inches long, elliptic-lanceolate, bluntish, entire, tapering down at the base into a short footstalk; they are smooth on both sides, furnished with one rib and many transverse veins connected by innumerable reticulations. Sipulata none. Flowers nearly the size of Glaea Flammula, or, as Linnaeus says, of a cabbage blossom, in a coriaceous pance; whether terminal or axillary cannot be determined from the specimen, though he affirms the former. There is some appearance of a glandular depression at the back of the footstalk where it joins the leaf.

S.

GLUTEA, ARTERIA, in Anatomy, a large artery distributed chiefly among the gluteal muscles. See Artery.

GLUTENS, ANIMAL, in Chemistry. See Animal Fibre and Glue.

GLUTENS, VEGETABLE, a substance resembling the former, and found in several vegetables. (See Vegetable Fibre.) Bozachi first found that wheat-flour contained glutens in considerable quantity, and from this it is obtained by the following process. (Aikin's Dict.) Mix 16 great quantity of wheat-flour with a little water, and knead it with the hand into a tough ductile paste, then let a very slender stream of water keep dropping on the paste, while it is incessantly worked about with the hands, and the water will run off white and turbid, owing to the fecula or flarch which it carries off. The paste in the mean time gradually becomes more of a grey and almost semi-transparent appearance; and when the water runs off quite clear, nothing is left in the hands but pure gluten. No other precaution is required in this preparation but that of not dressing the flour at first with water, but only using a very small quantity with much kneading, that the gluten may not be carried off along with the flarch. Good wheat-flour will yield in this way about a fourth of its weight of gluten, and no other flour but that of wheat will yield it, except in a very small proportion, and hence probably the peculiar property of wheat-flour to make bread without any other addition than a ferment." See Bread.

Gluten is contained in small quantity in several vegetable juices and other parts, and may be separated from them. Bird-lime is supposed to be chiefly gluten, and the green fecula of plants abounds with it. See Bird-lime and Fecula.

GLUTEUS, in Anatomy, a name given to three large muscles, concerned in the motions of the pelvis and thigh, and distinguished from each other by the epithets magnus, medius, and minor. They occupy the outer and posterior part of the pelvis, from which they arise, and form the large flaky prominences named the buttocks.

The gluteus magnus, or maximus, is a very broad, thick, and bulky muscle, composed of large fasciculi loosely connected together, and separated to a considerable depth by adipose and cellular substanse, of an irregularly quadrilateral figure, and situated obliquely at the outer and back part of the hip. The round ed swelling, which forms the outline of the buttock at its back part, and the projection of which hides the termination of the large intestine, is formed entirely by this muscle. Its external surface has the same degree of convexity as that of the buttocks; the internal, which covers the tenderness of the ischium, and the great trochanter, is proportionally concave. It arises, on. By short aponeurotic fibres, from about one inch of the posterior extremity of the crista ili, where the bone extends beyond the facia, and from the neighboring part of the immediately subjacent nates. At this origin an aponeurosis may be observed, continuous with that of the thigh, and of the vertebral muscles. 2ndly. From the ligament connecting the posterior end of the iliac crista, to the back of the facia; and here it is continuous with the tendinous origin of the latissimus dorsi, longissimus dorsi, and semitendinosus. 3rdly. From the external margin of the facia, near its left foramen, from the tubercle at the side of the termination of the canal containing the medulla spinalis, and from the articulation between the facia and coccyx. 4thly. From the posterior surface of the coccyx. 5thly. From the surface of the great sphenoid ligament. From these points the fibres all proceed obliquely downwards and outwards, nearly parallel to each other; the muscle is at first rather thinner and narrower, and grows broader and thicker as it proceeds. Its upper margin is closely attached to that part of the femoral facia, which covers the glutaeus medius. The superior fibres, having turned over the great trochanter, join the upper part of the common tendon. The latter is most intimately connected to the facia lata; so that, on the first inspection, the glutaeus magnus appears to be inserted into this facia, throughout the whole line of its front edge; we cannot, however, easily distinguish these parts by cutting through the muscle, and turning it aside. The common tendon receives the muscular fibres from above the trochanter, to below the quadratus femoris, where it begins to be attached to the bone. It is very firmly attached to the rough line, which commences at the root of the trochanter, and joins the linea aspera, occupying by its insertion a space of about three inches; it is situated here between the vastus externus and adductor magnus, to the former of which it is connected by tendinous and muscular fibres.

The exterior convex surface of this muscle is covered for a small space towards its upper part by a thin plate of the facia lata, and is everywhere immediately subjacent to the integuments. The inner surface covers the os ischiium, the facia and coccyx, the origin of the vertebral muscles, the glutaeus medius, the pyramidalis, the gemelli, the obturator internus, the quadratus femoris, the tenderness of 6
the ilium, the origins of the femintendinosus and biceps, the adductor magnus, the sciatic nerve, and the great trochanter. A large synovial membrane, placed between this muscle and the ilium, arises from the surface of the former and is considered to afford a clear proof that man was designed for the attitude on two feet. This gives to the human frame the beauty and symmetry which we see in the mammals. The pelvis has been turned forwards, and the gluteus magnus will restore it; and if the circumstances admitted of this part being carried backwards, the same muscle would produce that motion. The other two glutei are not efficiently concerned in the attitude of standing on both feet; but they are the principal agents in supporting and balancing the trunk on one foot, and inclining the pelvis over the head of that thigh bone on which the body rests, so that the centre of gravity of the trunk may be in a line drawn through that lower extremity. In this case their exertion counteracts the tendency of the trunk to fall on that side which is not supported. These muscles are further employed in the same kind of way in progress: the gluteus magnus balances the pelvis which one leg is carrying before the other, and brought to the ground; and the two others support the trunk laterally, while the limb of the opposite side is in the air. In the attitude on one leg, the gluteus magnus can rotate the pelvis on the thigh-bone of its own side, so as to turn the symphysia pubis towards the opposite side. When the glutei move the thigh on the pelvis, the magnus reduces the bone to its former position, where it had been previously bent; and, if the pelvis be carried forwards, it may move the former still farther in the direction of extension; the medius and femi-medius move the thigh away from the opposite limb. The gluteus magnus has the effect also of rotating the thigh outwards; while the anterior fibres of the two smaller muscles will rotate it inwards. The former is a tenor of the facia lata.

GLUTTON, in Zoology. See Vursus Gula.

GLYCAS, Michael, in Biography, a Greek historian, who is supposed to have flourished in the 12th or 13th century, though by some others he is referred to the 15th. He was a native of Byzantium, but spent a great part of his life in the island of Sicily. He published, in four parts, containing the history of the world, from the creation to the birth of Christ, and that of the Byzantine emperors down to the death of Alexius Comnenus in 1188, interpolated with a number of theological, philosophical, and physical discussions. An edition of the "Annales" in Greek and Latin was given to the public by father Lübke, in 1668. The third part has been published separately by Meurinus, with a version and scholia. Several letters of Gleys have been published in different collections. He was undoubtedly a very learned man, and the correspondence which he maintained with the literati of his age shew that he lived in very high reputations. Moreci.

GLYCERIA, in Botany, from ψίρες, sweet, the seeds being eaten in Germany, and called Mamma-seeds, on account of their sweet taste. Brown Prod. Nov. Holl. v. 1. 179—Class and order, Triandria Digynia. Nat. Ord. Gramma. This new genus of grasses is founded by Mr. Brown on the "Pennis fluitans" of Linnéus, Penna fluitans, Sm. Fl. Brit. 95, with the following characters.

"Glycera" (Calyx) of two valves, containing many flowers. "Spicis" cylindrical, awnless. "Perianth" (Corolla) bearded, its valves of equal length. "Scale under the greenen foliary, sickly, like a half shield. Stigmae doubly compound. Seed
GLYCINE.

unconnected, oblong, with a furrow at one side. Flowers somewhat panicled."

We cannot but advert to the propriety of separating the genus in question from Pass and Pfefferia, as far as habit is concerned, but we are very certain that Pass diffusa, marrineri, precumbers, and rigid of Fl. Brit. and Cynanchus durus of Linnæus cannot fail to go along with it, though we fear the characters given by the gigantic writer above quoted will not be found to hold good in all, if in any, of these. Perhaps the following definition of Glycine, formed on simple and obvious Linnæan principles, may be unexceptionable, as embracing them all, and preferring an analogy with genera already established.

Calyx of two valves, containing many florets. Spikelet linear. Corolla of two oblong, obtuse, bearded valves. S.

GLYCINE, from glycos, sweet, the particular application of which is not very obvious, having originated merely from the sweet taste noticed by Cornuti in the leaves and tuberous roots of G. Apis. This indeed is the original, and perhaps the only true Glycine, the numerous assemblage of species ranged under this genus, by recent writers, being very various and in fruitification, especially those of New Holland, as will appear by Mr. Bucquoi's definition of the second part of his valuable work.——Linn. Gyn. 373. Schreb. 495. Willd. Sp. Pl. v. 3. 1053. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 3. 73. Juss. 357. Lamarck Illustr. t. 1. 529. DC. t. 154. Clasf and order, Diadelphus Decandria. Nat. Ord. Papilionaceæ. Linn. Leguminosæ. Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, compressed, two-lobed; upper lip notchèd, obtuse; lower longer, three-lobed, acute, its middle tooth longest. Cor. papilionaceous. Standard inerely heart-shaped, deflexed at the fides, gibbose at the back, the extremity at the top, and straight, till driven back by the keel. Wings small, oblong, ovate towards the extremity, bent downwards. Keel linear, falcate, curved upwards, prelving the standard upward by its obtuse and dilated extremity. Stam. Filaments in two sets, (one simple, the other in nine divisions,) gradually separated at the top, revolute; anthers simple. Pet. German oblong; style cylindrical, rolled spiral; stigma obtuse. Peric. Legume oblong. Sedi kidney-shaped. Eff. Calyx two-lobed. Stamens in distinct sets. Keel of the corolla forcing back the standard with its point.

Obf. Glycine Apis and frutescens have a two-celled legume. G. moschata is a singular instance of a separation of sexes in flowers of this tribe.

This genus has accumulated from two species (G. Apis and frutescens) in the Hortus Cliffortianus, to eight in the firft edition of Species Plantarum, nine in the second, fifteen in the fourteenth and last edition of Syst. Vegetabilium, and finally to forty-four in Willdenow. These now form a very heterogeneous assemblage, and the New Holland ones constitute a distinct genus, the Kennedean of Ventenat, distinguished by its spontaneously reflexed standard, and legume of many cells. The whole requires a thorough revision. Some are of opinion that G. Apis is generically distinct from all the others, and if so it would be more convenient, though this is one of the original species, to give it the generic name of Apis, retaining Glycine for such more common and more numerous ones as may answer to the usual idea of the genus, an essential character being selected to combine them together.

Glycine, in Gardening, contains plants of the shrubby climbing kind; of which the species cultivated are the shruoby glycine, or Carolina kidney-bean tree (G. frutectens); the two-spotted glycine (G. bimaculata); the reddish-flowered glycine (G. rubicunda); and the fawyer glycine (G. coccinea).

Method of Culture.—In the first it may be effected by laying down the young branches in the early autumn. When well-rooted in the following autumn, they may be taken off and planted where they are to remain, or in nurseries-rows, being watered when the weather is hot, and the roots protected in the winter by some fort of hawny material. They are found to succeed best in dry, warm, light soils of ground.

And the other kinds may be raised by sowing the seeds when they can be obtained from abroad, or produced here in pots of light earth, in the early spring, being afterwards removed into other pots, and placed in the green-house, or Cape flow. It has been surpassed by Mr. Curtis, that the two last may succeed in the open air, when planted out in warm sheltered situations, and protected during the winter season by some convenient matting or other means.

All the sorts are ornamental in their flowery climbing growth; the first in the open ground, and the latter in the green-house and flower collections.

Glycine, Glycine, Fr. in Chemistry. This earth was first discovered by M. Vaquelin in 1798. He detected it in the analysis of the beryl, undertaken at the desire of Hali, who wished to have it ascertained by a strict chemical inquiry, whether the beryl and emerald were as similar in their composition as in the form of their crystallizations. The results of this inquiry were conformable to the expectations which gave rise to it, and the existence of a new earth in the beryl and emerald was confirmed by the experiments of Klapproth. Vaquelin, in the memoir in which he announced his discovery, called the new substance merely the earth of the beryl: afterwards, with his associates, Guyton, Fourcroy, and Chaptal, he determined on the name glycine, derived from the Greek glykos, sweet, because all the soluble salts of this earth have the property of producing a certain sweet astringent tincture. When the name was selected, the character on which it was founded was peculiar; but though it ceased to be fo on the discovery of vitriol, yet as the name conveys no erroneous ideas of the body, to which it is applied, there is no impropriety in adhering to it: besides, the table full forms as a physical characteristic for, according to Vaquelin, the sweetness of the salts of glycine has a sensible difference from that of the salts of vitriol, particularly of the sulphate.

Glycine, in its pure state, has not yet been discovered in nature; indeed, its occurrence in compound minerals is exceedingly rare, for it has only been found in the beryl, or ultramarine, and the emerald and the gadolinite; and it enters but sparingly into the composition of these bodies; the beryl, in which it is most abundant, containing, according to the analysis of Vaquelin and Rabe, no more than 17 per cent. From the analogy which exists between glycine and alumine, the former is very liable to be taken for the latter by chemists who do not pay particular attention to accuracy in their analytical inquiries. The first analyses of the emerald made by Klapproth and Vaquelin afford an infall of this kind; and M. Bindeheim committed a similar error in his analysis of the beryl.

To obtain glycine in a state of chemical purity, finely powdered beryl is to be effused with three times its weight of caustic potash in a silver or platinum crucible: the crucible is to be exposed for two hours to a strong red heat, and the mixture in fusion is to be frequently stirred with an iron rod, in order to keep the earth as much as possible suspended.
The description of the document content is as follows:

**GLYCINE.**

Glycine is a white, translucent glass, which does not become opaque on cooling. It refines on mixing with sulphur or phosphorus, but it appears from Fourcroy that a sulphur may be formed by decomposing the sulphate of glycine by charcoal. Glycine is soluble in a saturated solution of sulphuric acid. A hydro-sulphate of this earth, it is likewise said, may be obtained by dissolving the sulphate in water. In these properties it approaches the alkaline earths, and constitutes apparently the link of union between them and the clays to which it belongs. It is dissolved by both the fixed alkalies in their liquid state, but in a less degree than alum, and, like alumine, is not taken up by amonia. It is dissolved in a solution of carbont of amonia, as has already been mentioned. It very readily unites with acids. All its soluble salts produce, when first tainted, the formation of sweetnefs, which gradually becomes alriagent.

In relation to its affinity for acids, glycine appears to be intermediate between alumine and magnesium, for it decomposes only the salts of alumine, yttria, and zircon. And the order of its affinities is much the same, according to Fourcroy, as that of the other earths, sulphuric acid holding the first place, and nitric, muriatic, phosphoric, fluoric, boracic, and carbonic following. No experiments have been undertaken yet, to ascertain what combinations of glycine is capable of forming with the earths and metallic oxides.

Yttrium and alumine are the only earths for which glycine is liable to be mistaken: the properties in which it resembles them are, rather unfortunately, of a most striking kind, but it has a number of other characters which are very distinctive, and fully demonstrative of its peculiar nature. Glycine is similar to alumine, in being soluble in certain solutions of the fixed alkalies, and in some of its physical qualities; but it differs from alumine in affording with acids sweet alrimental salts, in not yielding alum with sulphuric acid and potash; in posilising a greater affinity for acids; in being entirely soluble in carbont of amonia; and lastly, in not being precipitated from its solutions by oxalat, tartrat, or prussiat of potash. It is to be distinguished from yttrium, by its greater solubility in carbont of amonia, the latter requiring for its solution five times as much carbonted alum as glycine, by its fall of solubility in carbont of amonia, the latter requiring for its solution five times as much carbonted alum as glycine, by its fall of solubility in carbont of amonia, the latter requiring for its solution five times as much carbonted alum as glycine, by its fall of solubility in carbont of amonia, the latter requiring for its solution five times as much carbonted alum as glycine.

Glycine was considered as a simple body, till the important discoveries of Mr. Davy gave it new analogies; and though the compound nature of this earth is not yet fully demonstrated, yet there is every reason to believe that glycine, like the alkalies and alkaline earths, is a metallic oxide; and the results of the experiments which Mr. Davy made on this body are explained by such a supposition. This gentleman negatively electrified glycine, slightly moistened in contact with an amalgam of potassium, under naptha, by a battery of 200 plates. After an hour the amalgam was thrown into water, and an alkaline solution was produced, which became cloudy when neutralized by acid, thus indicating the presence of the earth. Mr. Davy, following the nomenclature which he has adopted in respect to the new metals, has proposed glucium for the name of the metal of glycine, when its existence is no longer doubtful.

Carbonate of glycine, as well as all the other metals of this earth, has not yet been discovered ready formed in nature. It is procured by precipitating the sulphate, nitrat, or muriat of glycine, by either of the carbonate fixed alkalies. The precipitate, which is the salt sought after, being well washed and dried, appears in the form of soft white powder, having a greasy feel and great lightness. Carbonate of glycine is insoluble in water, and it is unaltered by exposure to the air. It is decomposed by all the acids, and by the action of a red heat; most probably all the alkaline earths deprive it of carbonate acid in the moist way. According to Klaproth it is composed of

<table>
<thead>
<tr>
<th>Glycine</th>
<th>53</th>
<th>Carbonic acid and water</th>
<th>47</th>
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**Phosphat of Glycine.**—Phosphat of soda, added to a neutral solution of nitrat of glycine, throws down this salt either in a white plumbous form, or in a mucilaginous state. It is insoluble in water, impid and uncremallizable. It is not decomposed by a violent heat, but it fuses into a white transparent glass, that does not become opaque on cooling. Phosphat of glycine is soluble in phosphoric acid. The sulphuric and nitric acids first diffuse this salt, and
and afterwards decompose it. Muratic acid produces a
fumarolic effect, but in a less degree. It is likewise readily
decomposed by the carbonated alkalis and by all the car-
bonated earths, except carbonat of magnesia. With the ful-
phat, nitrat, and muriat of alumine, it suffers decomposi-
tion, a mutual exchange of acids taking place between the
two earths.

**Sulphat of Glycine.**—Glycine, both in its pure and car-
bonated state, diffuses very readily in dilute sulphuric acid.
The solution by spontaneous evaporation affords octahedral
crystals, composed of two oblique four-sided pyramids
joined base to base, with their edges and solid angles trun-
cated. It also, but with difficulty, yields when evaporated
on a sand bath small needle-form crystals. The solution,
when evaporated nearly to dryness, assumes a fumarous con-
finement. Sulphat of glycine, has a remarkable sweet
and alluring taste. It is very soluble in water. Heated,
it intumescence, suffers the watery fusion, and becomes pul-
verulent from the distillation of its water. It is completely
decomposed by a strong red heat, the acid being expelled
and the earth left in its pure state. It has been already ob-
erved that fulphat of glycine is converted, when heated
with charcoal, into a fulphurat, but this fulphurat, according to
Fourcroy, does not become a pyrophorus, like alum
thus treated, though fulphat of potash be present. A sotu-
ion of nut-galls, added to this salt dissolved in water,
produces immediately a white precipitate. Previous to the
knowledge of this fact, such a property was conceived to
be peculiar to metallic salts.

Sulphat of glycine, slowly evaporated with a small
quantity of fulphat of potash, forms minute crystalline
grains, which dissolve with ease in seven or eight times
their weight of cold water. Glycine, added to a solution
of alum, precipitates the alumine, and most probably pro-
duces a compound, similar to the preceding one. Sulphat
of glycine is decomposed by all the alkalis and earths,
except alumine, yttria, zircon, and flix.

**Nitrat of glycine** is procured by saturating nitrif acid
with glycine. The solution of this salt does not afford
crystals by evaporation, but produces a ductile and adhesive
mass, which, when further dried, falls into powder. It is
very soluble in water and insensitive in the air. It attracts
moisture so strongly, that it might, if strongly pressed, be ad-
vantageously employed for absorbing the hygrometrical
water of gases. Its taste is suffocating and balsamic.
Thickening of galls dropped into a solution of this salt pro-
duces a yellowish brown precipitate. Nitrat of glycine
fuses at a low heat, but if the heat is increased, the acid is
expelled. It is decomposed in the moist way by fulphuric
acid, and by the same alkalis and earths as the sulphat.
The proportions of its component parts are not known; but
Vauquelin has observed that a given quantity of nitrif acid
requires rather more glycine than alumine for its complete
saturation; yet the former earth, though in combination with
nitrif acid more soluble than the latter, decomposes, with
the assistance of heat, nitrat of alumine, precipitating the
alumine, and forming nitrat of glycine.

**Muriat of glycine** is procured by dissolving glycine in
muratic acid. It is in some respects similar to the nitrat,
but differs in its solution, affording by careful management
small crystals, the form of which, on account of their size,
have not yet been determined; and in not being subjected to
deliquescence on exposure to the atmosphere. Its taste is
similar. A solution of this salt in dilute alcohol is said to
be an agreeable sweet liquid. When distilled per fes, the
acid distills off, and leaves the earths in a state of purity. It
is also decomposed when heated with phosphoric acid. The
fume effect is produced by sulphuric and nitrif acids, and
by the alkalies, and all the earths that decompose the nitrif.

**Actat of glycine.** which is prepared by dissolving
the earth in acetic acid, has not yet been procured in a crys-
talline form. Its solution, when evaporated, acquires a gluttonous
confinement, and the salt becomes brittle as it slowly

**Succinat of Glycine.**—Any of the succinates added to
the nitrat, muriat, or sulphat of glycine, precipitate the
salt in question. Its properties have not yet been enquired
into.

We are indebted for the imperfect knowledge we have of
the combinations of glycine, with the several acids above-men-
tioned, principally to the celebrated discoverer of this earth.
Glycine, in no form as yet, has been usefully employed; yet
Vauquelin conceives that the earth itself and some of its
fats, when they can be procured with facility, may admit
of such an application in chemistry, in medicine, and the
arts. Its marked attraction for animal and vegetable col-
ouring substances induced him to think that there was
a probability of its being serviceable as a mordant; and
the peculiar taste of some of its fats gave rise to the hope
that these combinations might produce salutary effects on
the animal system. If his expectations should be realized, we
must agree with Vauquelin, that these fats will be some of
the most agreeable medicines that exist. Ann. de Chem.
part. ii. 1808. p. 352.

**GLYCONIAN, GLYCICON.** in the Greek and Latin
poetry.

A Glyconian verfe is that consisting of two feet and a
yllable; at least this is Scaliger's opinion; who adds, that
the Glyconian verfe was also called the Europician verfe.
See Verses.

Others hold, that the Glyconian verfe consisted of three
feet, a pondece and two dactyls; or rather a pondece, chlo-
riambus, and an iambus or a pyrrhic; which opinion is
the most followed.

"Si te diva potens Cypris," is a Glyconian verfe.

**GLYCYRRHIZA, in Botany.** Liquorice. Glycyrrhiza
is of Dioscorides, who describes the plant very faithfully and
accurately; but it is remarkable that he says the flower
is like a hyacinth, which can allude to the colour only, whether
his name be the Delphic hypsithros of modern botani-
tains. The word is composed of γύκος, sweet, and ρηζις, a
root; and the name in apothecaries' Latin, liquiritia,
as well as the English one, liquorice, the French reglifre,
the Italian regalzina, &c. with all their corruptions, originate
t. 625. Ger. t. 148. Clairv. and order, Diadepia Decan-
Gen. Ch. Gen. Pieranth inferior, of one leaf, tubular,
two-dipped, permanent; upper lip in three deep segments,
of which the lateral ones are linear, the central broadened
and cloven; lower perfectly simple, linear. Cor. papilion-
aceous. Standard ovato-lanceolate, fragrant, longell. Wings
oblong, very like the keel, but rather larger. Keel of two
petals, acute, its claw the length of the calyx. Stam.
Filaments in two fes, one much, the other in nine divisions,
fragrant; anthers simple, roundish. Fil. German shorter
than the calyx; styleawl-shaped, as long as the flumes;
 stigma obtuse, ascending. Petio Lappate ovate or oblong,
compressed, acute, of one cell. Seeds very few, kidney-
shaped.
GLYCYRRHIZA.

Eff. Ck. Calyx with two lips; the upper three-leaflet; lower simple. Stamens in distinct sets. Legume ovate, compressed, of one cell. Seeds one or two.


2. G. fetida. Desfont. Atlant. v. 2. 1709. t. 159.—Legumes prickly. Flowers spicked. Stipulas lanceolate. Leaflets feally beneath; the terminal one nearly sessile.


5. G. aesculina. Linn. Suppl. 330. Pallas. Reis. v. 3. t. G. 1. 1. 2. (G. hispida; ibid. 754.)—Legumes smooth, beaded. Flowers spicked. Stipulas lanceolate. Leaflets roundish, prickly beneath. Stem and footstalks prickly. Found by professor Pallas in sandy ground between the river Wolga and the Tanais. Pallas MSS. The root is extremely sweet, especially in the spring. Stems usually two, rarely three, aching, a span high, nearly simple, leafy, rough with numerous little rigid prominent prickles, as are the footstalks, and backs of the leaflets. The latter are roundish or obovate, obtuse with a little point, smooth and velvety above. Flowers longish, pale violet, with white wings and keel, in one or two thick spikes at the top of each stem. The legumes are drawn by Pallas above an inch long, recurved, of a necklace-like form, and smooth, containing many seeds. The calyx is oblong, purplish, rather hairy. It has the habit of a Glycyrrhiza, flowers of an AfroGalana, and fruit apparently of a Coronilla; nor does the calyx answer to the generic character, being five-leaflet.

6. G. hirsuta. Linn. Sp. Pl. 1046. (G. orientalis, filicaulis hirsutiflora; Tourne. Cor. 26.)—Legumes hairy. Leaflets oblong-lanceolate, the terminal one on a long stalk. Flowers spicked. Found by Tournefort in the Levant. Root perennial. Of this we have seen neither a specimen, figure, nor any further description.

GLYCYRRHIZA., in Gardening, furnished a plant of the herbaceous perennial kind, the common liquorice (G. glabra). It is a plant which has the roots running very deep into the ground, and creeping to a considerable distance, especially where they stand long uninjured.

Method of Culture.—A light sandy soil is the most adapted to the growth of this sort of crop, as its good effects consists in the length of the roots. The ground in which it is intended to be planted should be well dug and dunged the year before planting, that it may have become perfectly mellow, and the dung well rotted and mixed with the earth, otherwise it will be apt to flow the roots from running down and being properly supported; and immediately before planting it should be well dug again to the depth of three spades, and be laid very light and open.

When the land is thus prepared, fresh plants taken from the sides or heads of the old roots should be provided, care being taken that they have each a good bud or eye, being about ten inches long and perfectly found.

The operation of planting them should be performed about the middle of March, which is done in this manner: a line is first set across the ground, then, with a long dibble made on purpose, the flowers or cuttings are put in, so that the whole plants may be set into the ground, with the heads about an inch under the surface, in a straight line about a foot asunder in the rows, and a foot and a half or two feet row from row.

When the whole spot of ground has been thus planted, a thin crop of cowans may be sown over the land. These must be kept perfectly clean by the hoe, care being taken not to cut off the tops of the liquorice plants, as it would greatly injure them. All the onions which grow near the heads of the liquorice should also be removed. In October, the flowers of the liquorice should be removed, and a little very rotten dung spread upon the surface.

In the following spring, about March, the ground should be slightly dug between the rows of liquorice, burying the remaining part of the dung, being very careful not to cut the roots.

During the summer they must be kept quite clean by occasional hoeing. The same operations must be annually performed, so as to keep the ground and plants in perfect order.

These plants must remain three years from the time of planting, when they will be fit to take up for use, which should be done when the flags are perfectly decayed; as when taken up too soon, the roots shrink greatly, and lose in weight.

In taking up the roots the ground is trenched over, row after row, to the full depth, and the young roots taken from the old roots cut into lots for new plantations; which should be made annually, in order to keep a constant succession of roots fit for being taken up.

The great art in this culture is to have the earth well trenched to a proper depth, to have good sets, and to keep the
GLYSTER. See CLESTER.

GMELIN, John George, in Biographia, a physician and eminent botanist, was born at Tubingen on the 12th of August, 1709. He was distinguished by his diligence and early attainments at school, and at the age of fourteen was deemed ready for entrance upon the academical studies of his native place. In 1727, he took the degree of doctor of physic, and went to Peterburgh, whither some of his teachers had been invited. Here he gained many favours from Blumentooff, the director of the academy, and was so highly esteemed, that, in 1729, he was elected one of the members of the academy, and in 1731 was appointed professor of chemistry and natural history. In 1733, he was selected for the department of natural history, in a commission formed by the Russian government, for the purpose of exploring the boundaries of Siberia; and set out on the 19th of August, with G. F. Muller, and Louis de l'Isle de la Croeyer, and a party of twenty-eight persons, consisting of draughtsmen, miners, hunters, land surveyors, and twelve soldiers, with a sergeant and drummer. In the month of February, 1743, Gmelin returned safe to Peterburgh, after having employed nine years and a half in this long and dangerous journey, which proved highly interesting to the sciences, and he returned the offices which he had before filled. In the year 1749, he entered upon a new professorship, to which he had been appointed, on the death of his predecessor, and on his return to Tubingen. He died of a fever in May, 1755, in the forty-fifth year of his age. The works, which were the result of his travels through Siberia, obtained for him a considerable celebrity, especially his "Flora Siberica, seu Historia Plantarum Siberiae," Peterburgh, 1747, 1749, in two parts, large 4to, with one hundred plates: the third and fourth parts were published by S. G. Gmelin. He also published his "Reise durch Sibirien," &c.; or Travels through Siberia between the Years 1733 and 1743, Gottingen, 1751, 1752, in four parts, 8vo, with plates. Gen. Biog.

GMELIN, Samuel Gottlieb, son of Philip Frederick Gmelin, was born at Tubingen in 1743; where he obtained both his philosophical and academical education, and graduated M. D. in 1763. He gave early proofs of genius, and during his travels in France and Holland distinguished himself so much by his knowledge of natural history, that he was appointed professor in the Academy of Sciences at Peterburgh. Like the subject of the preceding article, he spent several years in travelling through the distant provinces of the Russian empire, for the purposes of scientific investigation; but ultimately with a less fortunate result. He was appointed, together with professor Goldschnitt, to explore the province of Astraran, at the time that the transit of Venus over the sun's disc was expected, and set out in June, 1768. Having examined the countries on the western side of the Don, the Peridan provinces on the south and south-west side of the Caspian sea, the banks of the Wolga, and, lastly, the eastern side of the Caspian, so dangerous to travellers, he was recalled to Peterburgh. But when he had arrived within three days journey of Killar, a fortress on the Russian borders, he was seized by the chieftain of Chitakes, who plundered him of all his property, treated him with great barbarity, and imprisoned him. The health of Gmelin suffered considerably at this time, and he laboured under a flux, brought on by improper food and the effects of climate; yet the barbarian chief intercepted the provisions sent to him from Killar. The emperor gave orders that he should be released by force; but this was rendered impossible at that time by the rebellion of Paganief, and Gmelin died in confinement, on the 27th of July,
July, 1774. His death was much regretted by Catherine II., who made a liberal provision for his widow.

His works are: "Historia Fucorum," printed at Petersburg in 1768, 4to.; a subject to which botanists had paid little attention before him. "Reisen durch Russland, &c.:" or, Travels through Russia, for the purpose of exploring the three kingdoms of nature. This work was published in separate parts, as follows:—Part I. Journey from St. Petersburg to Tcherkaf, in the years 1768 and 1769. Petersburg 1771 with thirty-two plates. Part II. Journey from Tcherkaf to Astrakan, from April 1769 to June 1770; ibid. 1774, with forty plates. Part III. Journey through the northern districts of Persia, from that period to April 1772; ibid. 1774, with fifty-one plates.—Part IV. ed. after the author’s death, by professor Pallis, Journey from Astrakan to Cazirizyn; and also a second Persian Journey, 1772–74; ibid. 1786, with eighteen plates. The various and important information, contained in these publications, renders the imperfections of the style of this author of little moment. Gen. Biog.

GME, in Botany, received its name from Linnaus, in honour of John George Gmelin, a native of Tübingen, professor of chemistry and natural history at Petersburg, who spent ten years in travelling through Siberia, at the expense of the Russian government, and whose Flora Siberica, in four vols. quarto, with plates, is a book of great reputation and merit. The first and second volumes were published in his lifetime; the third and fourth long after his death, which happened in 1755, at the age of 46. He took his arrangement from Van Royen. Haller says the plates are unworthy of the beautiful drawings, which he himself had seen. This genus also serves to commemorate four or five more botanists of the family, especially Samuel Theophilus Gmelin, nephew of the former, and his successor in the professorship, who published a Historia Fucorum, with plates, in 1768, one of the most popular books on submarine botany, and who died in 1774, aged 31. Linnaeus 315. Schreb. 412. Willk. Sp. Pl. v. 3. 513. Mart. Mill. Dict. v. 2. Jaff. 108. Lamarck. Illust. t. 542. Caussin. t. 56. (Michelia; Amman in Ait. Petr. v. 8. 218. t. 18.)—Clafs and order. Didynamia Angiospermae. Nat. Ord. Peronoeae, Linna. Pictas, Jaff. Gen. Ch. Cal. Perlantia very small, inferior, of one leaf, nearly globular, with four small unequal teeth, permanent. Cor. of one petal, ringed, inflated; its limb four-cleft; the upper segment large and vaulted; lower, and lateral ones, smaller, obtuse, rounded, spreading. Stam. Filaments four; the two uppermost shorter and thicker; two lowermost curved upwards; anthers two-lobe; two of them sometimes smaller and simple. Pyl. German superior, roundish or obovate; style as long as the longer filaments, ascending; stigma acute. Peric. Drupa ovate, of one cell. Nutri. Obovate, smooth, of three cells, the lowermost abortive. St. de foliis. Eff. Ch. Calyx with four flat teeth. Corolla four-cleft, ringed, bell-shaped. Anthers cloven. Drupa superior. Nut of two fertile cells.

1. G. afsetosa. Linnaeus, Sp. Pl. 873. Burman. Ind. 132. (Jambula sylvatica parvifolia; Rumph. Amb. v. 1. 129. t. 40.)—Leaves roundish, somewhat three-lobe, acute, downy beneath. Native of Java, Amboina, and other parts of the East Indies. A tree, with straight, roundish, thinly downy branches. Leaves opposite, scarcely two inches long, of a roundish or elliptical form, acute, most generally furnished with a short broad lobe at each side, entire; smooth above; pale and downy beneath; the midrib fending off two principal lateral ones, a little above its base, and several smaller ones higher up, all which are branched. Foot- leafs downy, various in length, often nearly equal to the leaf, each with a small hairy bud above its insertion, and above that usually a straight, downy, horizontal spine. Flowers in a short, simple, downy, terminal raceme. Calyx downy, bespangled with several large, shield-like, smooth glands. Corolla large, yellow.

Rumphius's figure unquestionably belongs to this plant, but his description terms that of an Eugenia. Plukent's t. 305, f. 3. is certainly Eugenia dumetorum, and resembles our Gmelina only in being thorny; his t. 97, f. 2, may possibly be intended for Gmelina parvifolia, but is of no use as determining it.

2. G. elliptica.—Leaves elliptical, undivided, obtuse, downy beneath. Thorns none. Native, we presume, of the East Indies, confounded in the Linnucean herbarium with the foregoing, from which it differs in having rather larger leaves, which are exactly elliptical and blunt, more densely downy beneath, and not lobed. There are no traces of thorns. The inflorescence is rather more compound, but the remarkable glabrous calyx is the same. If a variety it is a very extraordinary one.

3. G. parvifolia. Roxb. Corom. v. 2. 31. t. 162. (G. coromandelica; Burman. Ind. 152.)—Leaves obviate, undivided or three-lobe, smooth on both sides. Common in evergreen and uncultivated places on the coaft of Coromandel, flowering in October and November. Roxburgh. It is often intermixed with G. affedosa, from which it differs in its more humble size, larger and conical thorns, and especially in its smaller leaves, which are smooth on both sides. Their flowers and fruits are alike, the latter being yellow, obovate, the size of a small cherry. We perceive on one calyx in our specimen a solitary gland, like those described in the two former.—Dr. Roxburgh mentions that cold water, stirred with a leafy branch of this shrub, becomes thick, from the abundant mucilage of the leaves, and is used in that state as a remedy for the heat of urine which accompanies gonorriphra. Water stirred with branches and leaves of Pediluminus Murex becomes in like manner mucilaginous, and is used for the same purpose, but soon loses its consistency, which is not the case with such as is prepared with this Gmelina. The Telingas call the plant Sibiri goosmadoo. It may possibly be Plukent's Lyricum Maderaspatumum, t. 97. f. 2, as Burman takes it to be, but Skoane's Rhamnus, Hilt. of Jamaica, v. 2. t. 207. f. 1, cannot be the same, though his figure affords no distinct indication of what he means.

4. G. arbores. Roxb. MSS. (Cumbulu; Rheed Hort. Mal. v. 1. 75. t. 41.)—Leaves heart-shaped, undivided, pointed, downy beneath; their lateral ribs cloven. Thorns none.—Sent from the coast of Coromandel by the Rev. Dr. Rottler, with the above name of Dr. Roxburgh. Gærtner has most justly pointed out the Cumbulu of Rheed as a Gmelina, though quoted by Linnaeus, doubtfully indeed, for his Bignonia Catalpa. This is a tall and upright tree, growing in sandy ground, with downy branches, and large, opposite, dalkeo, heart-shaped, entire leaves, downy and veiny beneath. Thorns none, as far as we can learn. The flowers are numerous and handsome, yellow, growing in compound, hairy, terminal clusters. Fruit yellow, obovate, rather small.

5. G. indica. Burman. Ind. 132. t. 59. f. 5. (Dorye Zock-kan of the Malay.) Leaves alternate, heart-shaped, crenate, smooth on both sides. Native of Java. Herb. Linna. A shrub or tree, with round, somewhat zig-zag, slightly downy branches. Leaves from half an inch to an inch long, alternate, or short hairy stipules. Vom, bluntly crenate. Thorns
straight, slender, acute, mostly longer than the leaves. The flowers and fruit seem to be unknown. We have only Bartram's very feeble authority for making this a Genista, which its alternate crenate leaves strongly disconcert, nor did Linnaeus ever venture to adopt it. S.

G. MONI, in Geography. See GESUNDEN.

G. NAA, a town of the district of Sturlia; 24 miles S.E. of Graz.

G. NADENJUETTEN, a settlement of the Moravians in America, situated on Muhkingum river, opposite to Salem, in the lands which belonged to the Mahican Indians.

Alfo, the name of a Moravian settlement, on the S.W. bank of Lehigh river, in Pennsylvania, about 20 miles N.W. of Bethlehem.—Alfo, a Moravian settlement, called New Nadianuetten, on Harlem river, about 24 miles from lake St. Clair, in the county of Wayne, and 28 N.W. of Detroit.

G. Napeezie, a town of Birma, on the Irrawaddy; so called from Napier, or Naples, a fort of sprat, half pickled and half putrid, used as a sauce by the Birmanis, and forming an extensive branch of trade: 116 miles N.N.W. of Rangoon.

G. Naphalium, in Botany, a plant, an ancient Greek name, from παφαλιον, fast down or weed, such as is plucked in cloth in dressing it, alluding to the woolliness of the herbaceus. Many writers have contended that Sambula marina of Linnaeus, and Sam. Fl. Brit. 867, is the true παφαλιον, an opinion extremely difficult to establish or to contradict, as all he says of it, that "its leaves are white and soft, useful for stuffing." However this may be, Tournefort, and lately Gaertner, have retained that plant, as the true and only species of Gnaphalium. The Gnaphalium of Linnaeus however is a very extensive and comprehensive genus, from which all species have of late been separated. See EVENKVEST—Cud-wool.—Linn. Gen. 419. Schreb. 550. Willd. Sp. Pl. v. 3. 1849. Mart. Mill. Dict. v. 2. Ant. Hort. Rar. v. 3. 173. Sm. Fl. Brit. 867. Jul. 179. (Elenchum; Gartn. t. 166. Antennaria; Gartn. t. 167. Anaisen; Gartn. t. 168. Filago; Gartn. t. 166. See Filago.) Chaff and order, Spongiastrum Polygamy-sperma. Nat. Ord. Composita Nutricula. Linn. Cylindracea, Jul. 179. Ch. Gaertn. 1829. Pit. matted, rounded; scales numerous, the marginal ones rounded, scarce, coloured. Car. compound, florets of the disk perfect, tubular, funnel-shaped, in five equal reflexed marginal segments; some female ones, without a corolla, are often intermixed towards the margin. Sain (in the perfect florets) Filaments five, very short, capillary; anthers forming a cylinder. Pfli!. (in the same floret.) German ovate; style thread-shaped, the length of the filaments; stigma cloven. In the female ones the same. Peri. none, except the permanent thinning calyx. Seeds in both kinds of florets alike, solitary, oblong, small, crowned with capillary or feathery down. Recipt naked. Edi. Ch. Receptacle naked. Down capillary or feathery. Calyx incised, its inner scales rounded, scarce, coloured. Willdenow reckons 145 species of Gnaphalium, of which 32 are shrubby, with allwo, white or crimson flowers, or rather without any golden ting; 12 are of a yellow or golden colour, likewise shrubby; 19 are herbaceous, with yellow, white or crimson flowers; 28 herbaceous, with white or reddish ones; and 20 have the inconspicuous whitish blossoms of the Filago family. The remaining 26 are species defined by Thunberg, without any attention to these leading features of the genus, so that it is impossible to lay to which they belong. Ten species, all herbaceous, are described as natives of Britain.

In this large genus it is by no means certain that all the species correctly answer to the generic character, particularly in the receptacle, which is not always flirrely naked, but bears a few bristles towards the margin, thus becoming an Ananthus of Gaertn. The marginal scales also, being sometimes a little pointed and reflexed, intertuch upon the proper character of Elchbrum: see for that article. In fact these genera are naturally one and the same, but, on account of their great extent, are conveniently separated by the character, though an imperfect one, of the more radiating calyx of Elchbrum. Linnaeus's error consisted in referring the latter to Xyranthum, which has a different habit and a chalky receptacle.

The first species in Wildenow, G. erosum, Linnaeus. 573. Curt. Mag. t. 360, is one of the most splendid. The leaves are clothed with very thick white wool, and the shrubby stem is terminated by a large corymbus of flowers, whose calyx is the size and shape of a rasperry-fruit, of a rich thinning crimson. The florets are orange-brown. It grows about 500 miles by the country above the Cape of Good Hope, and was for a long time known to European botanists merely by dried specimens, (one of which is figured by Edwards in his History of Birds, t. 183), brought occasionally to the Cape by the distant settlers.

Several others of the shrubby kinds are very ornamental to our green-houses.

Of the herbaceous sorts G. fistulm, whole flowers, usually yellow, are occasionally white or flirrey, always very splendid, is one of the most remarkable, but the strong scent of its vivid herbage when touched is offensive to most people. G. orientale is somewhat shrubby, though ranged with the herbaceous ones. Its thinning lemon-coloured flowers frequently serve for ornamental purposes, and are known by the name of Everlasting, a name appropriate to the whole genus.

G. margaritaceum, Engl. Bot. t. 2918, feres in Wales, where it grows wild, to adorn the Graves of the departed, elegantly alluding to immortality by the unfading nature of its flowers, and to spotless purity by the country where it grows. This plant is oft cultivated in cottage gardens.

G. deivum, Engl. Bot. t. 267, the Antennaria of Gaertn., so called from its plumy crown to the seed, is one of our most elegant species, found on dry rather mountainous heaths. The flowers are of a beautiful rose-colour.

The Cape of Good Hope is most fertile in this genus, but several fine species grow in South America, and there are some from New Holland to be added to what are enumerated in Wildenow. The mountains and fields of different parts of Europe produce various species, but few of the more handsome, except G. aranum, Fl. Dan. t. 641, and its near relation G. olympos in our gardens, gathered about the Bithynian Olympus by Dr. Sibthorp; both which vie with G. oriente in their thinning golden or lemon colour, and the olympos at least is a hardy perennial, of easy culture.

G. Naphalium, in Gardening, affords plants of the herbaceous and under shrubby kinds; of which the species mostly cultivated are, the tree everlasting (G. artemisia); the red-flowered everlasting (G. igneum); the eam ever- lasting, or immortal flower (G. oriente); the sweet-scented everlasting, or eternal flower (G. odoratissimum); the American everlasting, or eternal flower (G. marginalis).
the plantain-leaved everlasting (G. plantagineum); the common farinby everlasting, or rachas (G. rachas). Many of these are curious plants.

**Method of Culture.** — The first four sorts may be increased by slips from the heads or cuttings; by planting them in pots of light earth in the spring or summer months, and plunging them in a moderate hot bed, refreshing them often with water. When they have taken full root, they may be removed into separate pots, and be placed among other plants of the hardy exotic fort. They require the protection of a frame in the winter season.

The seventh species may be increased in the same manner, being placed at once where it is to remain, in a stilly sheltered borders, or other place that is proper.

The fifth and sixth sorts may be early raised by dividing and planting their creeping roots where they are to grow, either in the autumn or spring months.

These last are sufficiently hardy to stand the open air in warm situations.

They are all ornamental plants, the former in the greenhouse, the latter in the open ground.

**G. napheus.** — A plant given by Atthis and other of the Greek writers to the touch.

**G. narus.** In **G. graphes.** a town of Sweden, in the province of Helingland; 26 miles N. of Hudwickfaw.

**G. n. in **Antsology.** See Culex.

There is no species of insect that we have so much reason to dislike in regard to the injury it does us as the gnats. Others indeed give us more pain with their wings, but it is but by accident that we are struck by them; the gnats thirst for our blood, and follow us about in whole companies for it. There are many marshy places where the legs and arms are all the summer swelled to an enormous size by the repeated bitings of these insects, and in many other countries they are much more troublesome than with us.

But as troublesome enemies as these little creatures are to us, there is that about them which is extremely worthy our admiration; nor can we indeed fail greatly to admire even the very instrument of the mischief they do. They have beside this many very observable particulars in the construction of the creature.

All the naturalists of late years have applied the microscope to the examination of the parts of this little animal, and Swammerdams, Hook, Bonnuit, Leeuwenhoek, &c., have given very good accounts, and very valuable drawings of the creature.

There is a great number of very small species of gnats, and though none are considerably large, yet none of these approaches to the size of the tipula, or father long-legs, as commonly called. The larger tipules are therefore easily distinguished from the gnats; but Swammerdams, Goedart, Liefer, and others, have very often given us the smaller tipule among the species of gnats. Both have long slender bodies, and both prominent corselets, which make them look hump-backed; but when either of their insects is taken into the hand it is very easily known, the gnat having a very long trunk, and the tipula no trunk at all.

There is a prodigious number of species of the gnat kind, comprehending the smaller ones; Dr. Derham observed near forty different species about Upminster in Essex; but of those of a size to be remarked with care, and without the help of glasses, there are three principal kinds; the one has its body variegated with white and black; this is the larger kind, and its corselet is flecked with black or deep brown, and white lines or greyish ones; these have brown eyes; another is smaller than this species, and has a plain brown body, the colour of the corselet, and that of the eyes is the same as in the larger or frill species; the third kind is the smallest of the three and the most common, has its corselet reddish, or a faded reddish yellow, and the body whitish, and on the under part of the belly every ring has one single brown spot; the ring is grey: the eyes of this species are of a very pleasant green.

All the gnats have a long cylindric body composed of eight rings; their corselet is short but large, in proportion to the size of the fly, and to the are fixed the feelers, which are hairy, with six joints to each, and at the end two little claws, the wings, and the balancers: four frills are also found here, as is the case in other flies: the two feelers of these are placed near the head, and have been mistaken for ears.

The antennae of gnats are extremely worth observation, and differ much from one another. Some of them are elegantly feathered; these belong to the males of certain species, for the antennae of the females are not so beautiful. The brachi-horned or male gnat has two pairs, one of which is surmounted, at small distances, with long hair, forming out circularly, each circle Asiating as it approaches the extremity of the antenna; the other pair are longer and much thicker, and hairy from end to end. In the great bellied or female gnat, the first pair of antenna, though of the same figure as the male's, has hairs not near so long, and the second pair is shorter than the first by at least three parts in four.


**G. nat. Egg of.** See Eggs.

For the Eyes of Gnats, see Eyes of Flies.

**Gnat-worm, in Natural History, a small water insect, produced of a gnat, and which is, after its several changes, transformed into a gnat again.

From the eggs, deposited by the gnat on the surface of the water, proceed a number of minute worms, which sinking to the bottom of the water, form for themselves coverings of fine sand or earth, cemented together with a sort of glue, but open at both ends, that they may come out and enter as occasion requires.

These worms do not live in stagnant waters; but ditches, ponds, and other standing waters, afford them in vast abundance, from the middle of May till toward the beginning of winter. This is the reason why water and marshy places are found most to abound with gnats, and why the water fumers are found to produce the greatest numbers of them; because in dry seasons, the ponds and ditches, where they are to pass their worm-state, are dried up, and the worms killed. These are creatures, however, that one need not go far to seek, since a vessel of water, exposed in any open place in the summer months, will not fail to afford plenty of these worms in a little time.

Before these worms are arrived at their full growth, though they are then but small, they are easily found, because they are under a necessity of coming frequently to the top of the water, by having occasion for frequent respiration; and to do this, they are obliged to keep the end of a small pipe they are furnished with, from the fall ring of their body, above water. The end of this pipe is hollow and indented, and forms a sort of funnel on the surface of the water, it is of the length of about three rings of the body, and is somewhat thicker at its insertion than at its extremity.

As there is a vast number of species of gnats, there is no loss of the worms from whence they are produced: and to this is in a great measure owing the variety in the figures given of.
of the worms by the authors who have treated of them; which may also be not a little added to by the particular view in which those draughts have been taken. Notwithstanding all the variations of these figures, the general form of the animal is however the same in all, and the species cannot but be known from any of them. While the worm is young, the body is whitish or greenish; but when it is at its full growth, and draws near the time of its changes, it becomes greyish. The great transparency of the body of this worm gives a fine view of what paffes within it; it is at any time easily to see into the motion of the intestines, by which the food is pushed on towards the anus. The two principal trachæ are also seen very distinctly in this creature; they are two white tubes placed in a parallel direction one to another, and run from the first ring to the tube of respiration.

The great worm several times changes its skin in the course of its life. After three changes of this kind, which usually happen in the space of three weeks, or thereabout, it undergoes a fourth, where the old skin as if easily thrown off in the skin, but the animal now appears in a new form, that of a nymph; it is now shorter and rounder than before, and the body is so bent that the tail is tucked and placed in the head of the head; this, however, is only its form in a voluntary state of rest, for it can yet move, and when it pleases extends its tail, and seems about as fixed as when in its other state.

When the creatures have quitied their first habitations and the figure of worms, they re-ascent to the top of the water, inclosed in a kind of shell, with a large head and mouth, two black eyes, two horns, several tufts of hairs on different parts of the body, and a tail with a brush of hair at the end of it, which, being maceared over with an oily fluid, serves to keep them above water; their heads being sometimes lifted in the air, and sometimes plunged into the water, while the tail slides along the surface: and when the oil on the tail begins to dry, they shed from their mouth a fresh supply, which renders it capable of steering where they please, without being wetted and damaged by the water.

All the parts of the future great may be seen in this nymph; the skin of it is extremely thin and transparent, yet sufficiently tough and firm for the use it is intended for. It is uncertain how long exactly the animal lives in this state, for after it is turned and has been a nymph, its change into a great is very quick, and is attended with great danger to the animal, since multitudes are drowned in the act of getting out and springing into the air. Rambur, Hist. Inf. vol. iv. Baker's Microf. 1743. p. 88.

Gnat, in Rural Economy, a small well-known insect, which is said to destroy the leaves of some tender vegetables as soon as they appear, such as the turnip, &c.

GNEISS, in Min.alogy, a primitive rock, composed of feldspar, quartz, and mica; ingredients which are likewise those of granite, from which it differs in the arrangement of those parts; for while in the latter rock they usually appear as granular aggregations, those of gneifs are dispersed in such a manner as to exhibit a more or less flatly structure. This structure pafles through various degrees of dilatements; on one hand it approaches so near to the granular texture, that the dilatation between gneisfs and granite ceases to exist, while, on the other hand, when its peculiar texture is very obvious, and becomes what is termed this flatly, a paflage is formed into the primitive rock, next to it in antiquity, called micro-flate.

It is observable that as the stage of nature or granite, the feldspar is generally predominant with regard to the mica; while those varieties approaching mica-flate gradually exhibit a smaller proportion of feldspar and much mica. Sometimes, however, the mica is only apparently predominating, and from the circumstance, that on breaking a mass of gneisfs, the line of separation will more frequently pass through the mica than through the other layers, and display a whole surface of that substance; but another fracture, perpendicular to this, will, in this case, soon undeceive the observer. Though feldspar is, generally speaking, the predominant ingredient of gneisfs, yet the proportion of mica in this rock is, upon the whole, greater than what we see in granite; and the first this is the case, the more the mass appears granular, and the more it approaches to granite. It is often a matter of difficulty, in viewing small specimens only, to discern some kinds of gneisfs from the last-mentioned primitive rock; when the inspection of the former in their natural situation, and on a large scale, would have left but little doubt in the mind of the examiner.

Gneisfs, viewed in the large, as a mountain mass, always exhibits thick and distinct strata, whose outgoings, or upper terminations, are generally lower than the subjacent granite, and higher than those of the superincumbent mica-flate.

Werner (to whom we owe more correct ideas respecting this rock,) distinguishes four kinds of gneisfs, viz. that approaching the granular structure, the waved or undulated, the common, and the thin flatly gneisfs. As particular varieties of this, we have 1. The striped gneifs, in which the quartz is disposed in narrow bars, surrounded by feldspar, producing, on its longitudinal fracture, a striped appearance, not unlike that of some kinds of petrified wood; while its transversal fracture exhibits a granular disposition of the parts. This striped variety generally occurs together with the waved: such as at Ober-Newihofen, Reithand and Hartmannsdorf, near the Bohemian frontiers. 2. The sprinkled, or that kind of gneisfs in which the feldspar and mica exhibit themselves in the form of small neifs, such as at Hartmannsdorf and Bobitzer, near Freberg, and at Kuffenberg in Bohemia. 3. The short lamellar or flaky variety, such as it is found at Marienberg. The colour of the ingredients of gneisfs is not subject to great variation. The feldspar is generally of a greyish, yellowish, and reddish-white colour, feldorn yellowish-grey, or deep flesh-red, as it appears in many varieties of granite; upon the whole, its tint resembles that of the quartz with which it is accompanied, and which feldorn appears smoke-grey or brown. The colour of the mica is generally black or brownish-black, sometimes brownish, yellowish, and at, grey, and rarely silver-white or of a golden hue.

The component parts are found to vary also in regard to their fleisch; i.e. in general the feldspar is perfectly folted and shining; but sometimes it appears in incipient decomposition, or even converted into petrume; in the same manner as the mica is now and then seen falling into a greenish substance resembling felspar. Dr. Retsf. found that the porcelain earth dug at the Galgenberg, near Puchwitz, in the Sattz district of Bohemia, where it is used for whitewashing walls, is the result of the highest stage of decomposition of gneisfs; it forms thick strata, and contains a great quantity of small yellowish white, light grey, and pale clove-brown grains of quartz. In the same manner this mineralogist observed in that country frequent proofs of the conversion of the feldspar of gneisfs into a ferruginous clayey mafs. Near Kloeterly it is seen converted into bunt-stone or variegated clay.

Besides the more effential feldspar, quartz, and mica, the following accidental ingredients are now and then met with in gneisfs. 1. Hornblende: both the common and black tourmaline short, sometimes occur in the gneisfs of Freberg, and particularly of Spain. 2. Garnet: rare, but much more frequently than in granite; it occurs at Wiefenhal in Saxony, in Norway, in the island of Zealand, in Moravia, &c. 3. Hornblende...
blende: is but seldom found, and only in the thin flaty variety of gneifs, which passes into mica and hornblende slate.

4. Biotite: occurs principally in the gneifs forming the walls of the metallic veins in the Freiberg district; it is considered by some as mica thus transformed by sulphuric acid.

5. Actinote: is said sometimes to constitute an ingredient of gneifs in Switzerland and Hungary. Metallic substances that are sometimes found disseminated in gneifs, in the vicinity of veins, cannot properly be enumerated even as accidental component parts of this rock.

Gneifs abound in metals more than any other rock, as may be seen from the richness of the Saxou and Bohemian mines, those of Salzburg, &c. There are but few among the known metals that are not found in it, either in veins or beds.

"The oldest gneifs in the Saxou Erzgebirge," says Mr. Jamefon, "that with reddish-coloured feldspar, is the best productive in ores; but the newer, with white coloured feldspar, is the most productive; and the veins, though small, are numerous.

The oldest venigous formation appears to be that which contains tin-flone. The tin-ore is accompanied with wolfram, molybdenum, arsenic-pyrites, fluors-par, chlorite, topaze, and opal. The second venigious formation appears to be a lead-glance formation. The third formation contains principally of copper, and the ores are grey copper-ore, copper-glance, copper-pyrites, and variegated copper-ore.

The fourth formation, which is very extensive, contains ores of coal. The newest formation is that which contains ores of silver. Veins containing antimony, and red iron-flone occur in gneifs, and there are supposed to be newer than any of the preceding. The metallic beds that occur in this rock contain argentiferous lead-glance, blende, copper and iron-pyrites. It sometimes also contains formations of gold.

There are three considerable beds of rocks superincumbent to, and synchronous with, gneifs, and which are therefore not seen in granite, viz. granular linealstone, as it is observed, for instance, near Freiberg; primitive trap, such as hornblende-flate, at Kuttenberg in Bohemia, at Kongberg in Norway, &c.; and the older porphyry. (See LIMESTONE, TRAP, AND PORPHYRY.) Also small beds of common garnets, actinote, with magnetic iron-flone, iron-pyrites, galena, &c. now and then occur in gneifs.

Gneifs being generally superincumbent on granite, is hence considered as next to this primitive rock in point of age; there is, however, also a difference in the relative antiquity of the different kinds of gneifs, and on the whole it may be said that the nearer it approaches in its texture to Mica-flate, (see that article,) the more recent is its origin. From this it does not, however, follow that there should not be found kinds of gneifs which surpass in antiquity even some kinds of real granite. (See GRANITE.) The very thick flaky varieties of gneifs, with black mica and a small proportion of mica, may, in general, be said to be of more ancient formation.

Gneifs, though far less widely distributed than granite, has still a considerable range; it extends over the greater part of the Saxon Erzgebirge; the country about Freiberg, Glaubütte, Marienberg, Ehrenfriedersdorf, consisting almost entirely of it. In the same manner it is the characterizing rock of the Bohemian mountainous mining district. It is also found in Sicilia, Carinthia, in some parts of the Black Forest in Swabia; nor is it wanting in the Taurilikan mountains, in Salzburg, in the Swiss Alps, the Pyrenees and Vogdes, in Scandinavia, Greece, &c. In Great Britain it has been observed particularly in Scotland, in the islands of Coll, Tiree, Islay, and in the Shetland islands. It should however be observed, that frequently other rocks have been described as gneifs by topographical writers.

The economic use made of gneifs is that for paviug, and for the construction of walls; for both which purposes it is extremely well calculated, by reason of the facility with which it is wrought by the mason. Hence in the Saxon mining district not only all buildings are constructed of gneifs, but also the wailing of the thaths and levels is most advantageously executed in this useful rock.

GNÉMON, in Botany, a tree so called in the island of Ternate and others of the Moluccas, which is named in the Malay language Meninge, or Meninga, a word apparently of the same derivation, whatever that may be. See GÉNÉSCULES.

GNÉRGEN, in Geography, a town of Peria, in the province of Irak; 150 miles E. of Halyan. N. lat. 32° 26'. E. long. 55'.

GNÉRROTOOH, a town of Birnur, on the Irak, 150 miles N. E. of Paghman.

GNÉSEN, or GNÉSA, a city of Poland, in the duchy of Warsaw, built, as it is said, by king Lechus I., founder of the monarchy, and called Gnesia, from an eagle's nest found there, denominated in the Polish language Gnosia. The kings of Poland were crowned in this city, and the regalia were kept here till, in the year 1295, they were removed to Cracow. During the independent existence of Poland, it was famous as the site of an archbishop, who was primate of Poland, and who acted as interrex or regent upon the king's absence; and who also announced the event, convoked the diets and dictates of convocation, and performed the functions of royalty. Gnesia is 100 miles, N. E. from Bredow, and 150 W. from Warsaw. N. lat. 52° 26'. E. long. 17° 42'.


Genus Ch. Catkin composed of several remote, calous, thickened stools, each inhabited by a small partial colpus, which is entire, orbicular, but, entire, containing several fertile stools, the male ones inferior, the females superior, in the same whorl. Perianth of the male a minute ovate, covered scale. Cor. none. Stam. Filament one, thread-like, longer than the scale; anthers in pairs, connated.

Perianth of the female a rude, lacertate scale. Cor. none. Pijl. Genus ovate, superior, imbricated in the receptacle of its own whorl, the length of the flowers; style conical, short; stigma three-cleft, acute. Periz. Drupa ovate, of one cell. Sccd. Nut solitary, oblong, flattened, of one cell.


Opp. Linneus observes that Rumphius makes his plant dioecious, but he found it monocious, and even now one catkin entirely male, standing on its own stalk, near a female florae. The Vicia of Aubl., though somewhat differently described, is undoubtedly the same genus, and indeed is like the original Gynna in foliage, that it is not very easy to distinguish them.

J. G. Gneisenau.
1. G. Gnomon. Linn. Mant. 125. (Gnomon domeica; Rumph. Amb. v. 71. t. 71. 72. Beretinus fruticif; Chl. Exot. 55.)—Lateral veins of the leaves prominent, inter-branching archwise half way towards the margin. Catkins opposite, axillary, on simple stalks.—Native of the Molucca islands, and other places in the East Indies. We have it from Java. A tree, with slant, round, slender, smooth branches, swelling at each joint, under the inflorescence of the leaves, and somewhat forked at the ends. Leaves opposite, stalked, ovate, inclining to lanceolate, pointed, entire, smooth and shining, three or four inches long, furnished with a midrib, channelled above, prominent beneath, fending off several alternate, spreading, prominent though slender veins, which meet rather more than half way towards the margin in one common arching vein, whence numerous reticulations originate. Sisylus sum. Fpoitsalks half an inch long, channelled and keeled Catkins axillary, shorter than the leaves, two together from each opposite leaf, on simple stalks, their whors when young, crowded, but soon becoming dilate and broad-like, every sport bearing males or females. Linnaeus describes as a torn scale in the former, seems rather a very dense ensiform of short tufted fibres. Fruit the size of an ordinary acorn or bilber, its coat thin, sweetish according to Rumphius, but with too much acrimony to be eaten raw; as it is also the case with the leaves, which, when dried, are in almost daily use among the natives of Ambonya, though thought mawkish and unifid by Europeans.

2. G. Tba. (Thoa ureus; Aubl. Guian. v. 2. 387. t. 336.)—Lateral veins of the leaves oblique, inter-branching archwise. Catkins on simple stalks, from the repeated forks of the branches.—Gathered by Aublet in the woods of Guiana, where the natives call it Tba. His own speciemen in our polieeion has no fructification nor inflorance, so that we have been obliged to take part of our character from his figure. The leaves seem in general to be rather shorter and broader than in the former, but the chief distinction is observable in their lateral veins, which though they do in a similar manner run into one common arching vein, above half way towards the margin, are all together far more flint-like and prominent than in the first species. The fruit is like the former, reddish, and elliptical. Aublet says that when its outer skin is taken off, a dry substance is found underneath, composed of stiff depressed hairs, which easily separate from each other, and if any of them fall upon the human skin, they cause a great itching. The kernel of the nut, boiled or toasted, is good to eat. Birds of the owl or pheasant tribe feed in the woods upon this fruit, which they swallow whole. The same author affirms us that a clear gum issues from the bark and branches, but that when the main trunk or great branches are cut, a clear taflecks water liquor runs out, which may be drank by those who are distirred for water. This tree is almost always in flower and fruit. Aublet describes the catkins as male, with two female flowers at their base. This is so different from our specimens of G. Gnomon, that it might almost afford a specific character, but Rumphius describes the same circumstance in what he terms his male Gnomon, and Linnaeus advert to something like it. It should seem, however, that at the first, from the number of spicules, the genus is imperfectly dicotyled, one tree bearing catkins with female flowers, with perhaps left perfect males, in every whorl, while on another are found more efficient males in every whorl, with females at the base only, as in Aublet’s Tba. Such examples throw great light on the phytology of vegetable generation, and confirm the Linnaean theory.

3. G. funiculare. Buchanan MSS. (Gnomon funiculare; Rumph. Amb. v. 5. 12. t. 8. Ula; Rhed. Hort. Mal. v. 7. t. 12.)—Lateral veins of the leaves separate to the margin. Catkins opposite, axillary, on branched stalks.—Native of Ambonya and other places in the East Indies. This is a long trailing branched smooth frutic, turning black in drying, which the two former do not. The leaves are four or five inches long, various in breadth, pointed, firm, shining, distinguishe by their veins continuing distinct to the edge of the leaf. The flower-stalks are axillary, in pairs, more or less branched and forked; each catkin being about an inch long, composed of numerous orbicular imbricated scales concealing the flowers, and not unaptly compared in the Hortus Malabaricus to Long Pepper. Each stands on a partial stalk, of about its own length. The fruit resembles that of the foregoing, and is rounded over the fire, which renders the kernel edible. The tender leaves serve for a pot-herb, like those of G. Gnomon. The bark of the young twigs, split into thread, serves to make nets.

Rumphius’s vol. 5. t. 75, which he calls Ficus Gnomonformingis, but of which he seems not to have known the flowers, may possibly be the male plant of our last-described species, bearing only one or two female flowers at the bottom of the stalks of the male catkins, according to the analogy observed in the foregoing ones.

GNIAPDA, in Geography, a town of Hungary; 7 miles W.S.W. of Balatza.

GNIDIA, in Botany, from Guidius, where Venus had her temple. A feed, reported to be brought from thence, had been called Cucuradium; and there is a guidus, or Guides, supposed to be a kind of Orache; but Linnaeus probably had not these so much in view as the affinity of this genus to Paffiera, named after a favourite bird of the goddeis, in allusion to which it was first named Strutus by Van Royen. It is moreover akin to Daphne, one species of which, Daphne Guidus, has been taken for the ancient yadox.


Gen. Ch. Cal. Perianth inferior, of one leaf, funnel-shaped, coloured; its tube thread-shaped, very long; limb flat, in four deep segments. Cor. Petals four, fife, flat, inserted into the edge of the tube of the calyx, and shorter than its limb. Stan. Filaments eight, bristle-shaped, erect, inserted into the tube in two rows, the uppermost reaching nearly to the top; anthers roundish, erect, simple, of two cells. Pflt. German ovate, superior; style thread-shaped, as long as the tube, inserted laterally into the gynæum; stigma capitate, hispid. Peric. a dry berry, with a thin coat. Seed faltary, ovate, obliquely pointed.

Eff. Ch. Calyx funnel-shaped, four-clft, withering, including the stamens. Petals four, inserted into the calyx. Style lateral. Seed coated.

Obf. It differs from Paffiera only in having petals; which are often rather of a glandular appearance. The habit is altogether that of Daphne and Paffiera. Wildenow enumerates sixteen species, but of these G. pinifolia and radiata are one and the same, and G. daphnolc, Linn. Suppl. 225, seems rather to belong to Dais.

All the genuine species are natives of the Cape of Good Hope, of a humble shrubby growth, with white or yellowish sweet-scented flowers.

GNIEWE, or Mine, in Geography, a town of Prussia, in the province of Pomélie, on the Villula; 30 miles S.S.E. of Danzick.

GNOIEN,
GNOMON, a town of the duchy of Mecklenburg; 11 miles E.S.E. of Rottlock. N. lat. 53° 59'; E. long. 12° 53'.

GNOLL RAIL-WAY. This is an establishment in Glamorganshire, in South Wales, which we had not heard of at the time of compiling our article Canal; it is called an iron waggon-way, the flanch being on the wheels of the waggon, instead of being on the tram-plates, as is more common in that district. It commences at the flipping-place 200 yards below Neath bridge, on the Neath river; crosses the Neath canal on a wooden bridge, and proceeds about E. half a mile to the late Sir Herbert Mackworth's Gnoll collieries, of run coals, which are drawn up forty fathom, to be loaded into the wagons on this waggon-way, which has so regular a descent, as to require no inclined planes, or other considerable works.

GNOMES, Gnomi, a name which the Cabbalists give to certain invisible people, whom they suppose to inhabit the inner parts of the earth, and to fill it to the centre.

They are represented as very small of stature, tractable, and friendly to men; and are made the guardians of mines, quarries, hidden treasures, &c. Vigenure calls them Gnomons; the females of this species are called Gnomades.

Vigenure de Marville, in his Melange de Histoire et de Literature, tome i. p. 100, gives a relation of a conference with a philosopher of this class, who held, that an infinity of spirits inhabited each of the four elements, fire, air, water, and earth, under the denomination of Salamanders, Sylphs, Oudins, and Gnomes; that the Gnomes are employed in working or actuating the machines ofbrutes upon earth.

He added, that some philosophers of that sect held that these spirits were of two sexes, for the two sexes of brutes or moving machines; that they were more or less perfect as the brutes were; and that there was an infinite number of exceedingly small ones, to actuate the infinite number of insects and animals, both those that are visible, and those which are too small to come under our senses; that all these spirits, in general, govern their respective machines according to the disposition of the parts or organs, the humours, temperaments, &c. that they do not hay hold of all machines indiscriminately, but of those suited to their own character, element, &c. that a hungry one, for instance, feeds a Sylph or gnomon; a cruel one a tyrant, &c.

Gnomon, or Chria, is also used for a short, pithy, and sententious observation, reflection, or the like, which is worthy to be treasured up and remembered.

Such is that of Juvenal, "Orandum est ut fit mens fanam in corpore fane." The writers of rhetoric distinguish several kinds of gnomons, according as they turn on words, on actions, or both; denominating them verbal, active, and mixed gnomes or chrias. See APOPHTHEGM.

GNOMON, in Dialling, is the yule, pin, or cock of a dial, the shadow whereof pointeth out the hours.

The word is Greek, gnōmon, which literally imports some-what that makes a thing known; because the yule or pin indicates or makes the hour, &c. known.

The gnomon of every dial is supposed to represent the axis of the world; and therefore the two ends or extremities thereof must directly answer to the north and south poles.

See Dial and Dialling.

GNOMON, in Geometry. If a parallelogram be divided into four lesser ones, by two lines intersecting each other, and one of these parallelograms be retracted or taken away, the other three will make a gnomon, ordinarily called a figure.

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Or, a gnomon, in a parallelogram, may be said to be a figure formed of the two complements, together with either of the parallelograms about the diameter. Thus, in the parallelogram A C, Plate VIII. Geometry, fig. 96, the gnomon is M + x + z + N; or M + N + X + Z.

GNOMON, in Astronomy, the name given to any upright pillar, when used for the purpose of determining the altitude of a celestial object, but particularly the sun.

The extreme simplicity of this instrument renders it very probable, that it was the first ever used for astronomical purposes. It fortunately happened for the science, that it was capable likewise of being a very exact one; and all the knowledge the ancients had of the solar theory seems to have been derived from this instrument. The principle of it is so simple, as hardly to require explanation. If the height of a vertical pillar be compared with its shadow on a horizontal plane, the altitude of the sun may be deduced by trigonometrical calculation, since these two quantities are to each other, as the tangent to the radius, or as the sine to the cofine of the altitude required. The ancient obelisks found in Egypt and the East were probably instruments of this kind: it would be too much to conclude that every one was erected for astronomical purposes, but this was probably their original destination; and the figure of an obelisk being rather pleasing to the imagination, it was adopted as an ornament to public squares and buildings. As practical astronomy advanced to accuracy and perfection, however, the gnomon appeared to be subject to considerable defects. The shadow is found to be generally ill defined, so that its length cannot be very accurately measured; and to obviate this, the gnomon must be of greater height than is easily practicable. In modern Europe, therefore, the original gnomon has been entirely abandoned, and a new one substituted upon principles nearly similar, but of a somewhat different construction.

The gnomons of modern Italy are usually constructed in very large edifices; a small aperture is made in the upper part of the building, which permits a luminous circular image of the sun to be formed on the pavement, on which a meridian line is accurately traced; a plumb line is suspended from the aperture to the floor, and thus both the height of the aperture, and the distance of the solar image from the point immediately beneath it, is very accurately ascertained.

There are upon record some very ancient observations made with instruments of this kind, particularly of Pythias, who observed the solstices at Marseille about three centuries before the Christian era. Pliny mentions an obelisk erected by Augustus; this obelisk was brought from Egypt, and was said to have been made by Scopas, near a thousand years before Christ. It was used by Manlius for the same purpose for which it was originally defined, namely, to measure the height of the sun.

The Chinese have from the earliest time been in the constant practice of making use of a gnomon.

In the year 1278, a gnomon 40 feet high was erected at Pekin, by the Chinese emperor Co-cheou King.

Ulah Beigh, in the year 1357, observed the solstices at Samarcand by the shadow of a gnomon 165 feet high: and similar instruments are even said to have been used by the ancient inhabitants of Peru.

The gnomons to which modern astronomy is the most indebted, are chiefly those of France and Italy.

Paul Tofanelli constructed a gnomon in the cathedral of Florence, whose height was 280 feet. Xenenes repaired this, and published an account of it in 1757.
Gnomic projection is also called the "horologigraphic projection," because it is the foundation of dialling. In other respects it is not much used, because the circles of the sphere are projected into conic sections, which are difficult to be described. However, this projection has its conveniences in the solution of some problems of the sphere, on account of the great circles being all projected into right lines.

Mr. Emerson, known by an ingenious Treatise upon Fluxions, and a variety of other publications, has given the theory and practice of the gnomonic projection, in his Treatise on the Projection of the Sphere, Lond. 1749, 8vo. See Projection.

Gnomonica, "Groenouw, or Gnomonics, the art of dialling, or of drawing sun and moon-dials, &c. on any given plane.

It is thus called, as it shews how to find the hour of the day, &c. by the shadow of a gnomon or styke.

Gnomon, or Gnomonical projection, that which represents the circles of a hemisphere, upon a plain touching it in the vertex, by lines or rays from the centre of the hemisphere to all the points of the circles to be projected.

In this projection, all the great circles of the sphere are projected into right lines. Any lesser circle parallel to the plane of projection is projected into a circle. And any lesser circle not parallel to the plane of projection, is projected into a conic section.

The first and last of these gnomons are accompanied by a meridian line, often highly ornamented with the names of the months and signs of the zodiac, so as to serve the purpose of a calendar. One of the finest in Italy is in the Carthusian convent at Rome; built on the ancient Therme of Diocletian. There are two, one to the north 62 feet, another on the south 55 feet high: they were constructed by Bianchini in 1721.

Picard erected a gnomon in the royal observatory at Paris, which still exists.

The meridian line in St. Sulpice, at Paris, was begun in 1727 by Sully, a watchmaker, and has since been much improved and highly ornamented; its height is 80 French feet.

M. de Cerasis and Reggio in 1786, constructed a gnomon and meridian line in the cathedral at Milan: its height is 73 feet.

The reason why none of these gnomons are to be found in England, is that we do not regulate our clocks by solar, but by mean time: to this may be added our unfavourable climate, which would very much diminish the interest which they obtain in other countries, where they are made to serve the useful purposes of civil life.

Notwithstanding the great attention that has been paid to the construction of these gnomons, their use has been entirely superseded by modern instruments of small dimensions, so that to the astronomer they are now become merely objects of curiosity; yet to no instrument has astronomy greater obligation. The solar theory was first brought to a very improved state by the use of this simple instrument alone. The length of the year, and the obliquity of the ecliptic, were determined by it with very great exactness. The ancient method of deducing the solar theory was nearly as follows.

To determine the obliquity of the ecliptic, the length of the shadows were observed at the period of the solstices, and the extreme points to which the longest and shortest shadows extended at the moment of noon were carefully observed, and the altitudes of the sun deduced at each of these periods: half the difference of the greatest and least altitudes would be the obliquity of the ecliptic, subject to a small error arising from refraction, the effects of which were not known at that early period, nor were they very considerable in those southern portions of the globe in which astronomy had its origin. But though it was not difficult to deduce the length of the solstitial shadows, it was by no means easy to determine the day on which either of the solstices actually happened, because the length of the shadow would appear to be the same at those feasons for several successive days. It appears, by some very ancient Chinese observations still on record, that this inconvenience was remedied by observing the length of the shadow, ten or twenty days before the solstice; then waiting till they found the meridian shadow again of the same length, they concluded that the moment of the solstice happened on the intermediate day between these corresponding observations.

The length of the year was determined from observations of the equinoxes, which could be much more exactly observed; for the obliquity of the ecliptic being determined by the method above described, the length of the equinocial was known, and the day on which the shadow corresponded to the computed shadow was evidently the day of the equinox.

It was by examining a succession of these simple observations, that Hipparchus first discovered the great inequality in the length of the four seasons, arising from what is now called the equation of the orbit: and from the discovery of this important fact, we may date the origin of physical astronomy.

Gnomonica, Polyhedron. See Polyhedron.

Gnomonic. See Polyhedron.
The peculiar circumstance, and, indeed, the fome circumstances, and, but large, and, a peculiar kind of divine proceedings or emanations, which had no other foundation but in their own wild imagination.

In effect, the Gnostics confided, that these seons or emanations were no where expressly delivered in the sacred writings; but inferred, at the same time, that Jesus Christ had intimated them in parables to such as could understand him. They built their theology not only on the gospels and the epistles of St. Paul, but also on the law of Moses and the prophets.

These left laws were peculiarly serviceable to them, on account of the allegories and allusions with which they abound; which are capable of different interpretations.

However, their doctrine, concerning the creation of the world by one or more inferior beings of an evil or imperfect nature, led them to deny the divine authority of the books of the Old Testament, which contradicted this idle fiction, and filled them with an abhorrence of Moses and the religion he professed; alleging, that he was seduced by the malignant author of this world, who confuted his own glory and authority, and not the real advantage of men. Their persuasion that evil refered to matter, as its centre and source, made them treat the body with contempt, discourage marriage, and reject the doctrine of the resurrection of the body, and its reunion with the immortal spirit. Their notion, that malicious geniit professed in nature, and occasioned diseases and calamities, wars and defections, induced them to apply themselves to the study of magic, in order to weaken the powers or suspend the influence of these malignant agents.

The Gnostics considered Jesus Christ as the Son of God, and, consequently, inferior to the Father, who came into the world for the rescue and happiness of miserable mortals, oppressed by matter and evil beings; but they rejected our Lord's humanity, on the principle that every thing corporeal is essentially and intrinsically evil; and, therefore, the greatest part of them denied the reality of his sufferings. They set a great value on the beginning of the gospel of St. John, where they fancied they saw a great deal of their own or emanations under the Word, the Life, the Light, &c. They divided all nature into two kinds of beings, viz. hylic, or material; psyllic, or animal; and pneumatic, or spiritual.

On the like principle they also distinguished three sorts of men; material, animal, and spiritual. The first, who were material, and incapable of knowledge, inevitably perished, both soul and body; the third, such as the Gnostics themselves pretended to be, were all certainly saved; the psyllic, or animal, who were the middle between the other two, were capable either of being saved or damned, according to their good or evil actions.

With regard to their moral doctrines and conduct, they were much divided. The greatest part of this sect adopted very auline rules of life; recommended rigorous abstinence, and prescribed severe bodily mortifications, with a view of purifying and exalting the mind. However, some maintained, that there was no moral difference in human actions; and thus, confounding right with wrong, they gave a loose rein to all the passions, and affected the innocence of following blindly all their sensations, and of living by their tumultuous dictates. They supported their opinions and practice by various authorities; some referred to fictitious and apocryphal writings of Adam, Abraham, Zoroaster, Christ,
and his apostles; others boasted that they had deduced their sentiments from secret doctrines of Chrift, concealed from the vulgar; others affirmed, that they arrived at superior degrees of wisdom by an innate vigour of mind; and others affirmed, that they were instructed in those mysterious parts of theological science by Theudas, a disciple of St. Paul, and by Matthias, one of the friends of our Lord. The tenets of the ancient Gnostics were revived in Spain, in the fourth century, by a sect called the PræsHellens. (See Meheim's Eccl. Hist. vol. I.)

The appellation Gnostic sometimes also occurs in a good sense, in the ancient ecclesiastical writers, and particularly in Clemens Alexandrinus, who, in the person of his Gnostic, describes the characters and qualities of a perfect Christian. This he laboures in the seventh book of his Stromata, where he shews, that more the Gnostic, or learned person, has any true religion. He affirms, that were it possible for a knowledge of God to be seperated from eternal salvation, the Gnostic would make no scruple to choose the knowledge; and that if God would promise him impurity in doing of anything he has once spoken against, or offer him heaven on these terms, he would never alter a whtt of his measures.

In this sense the father uses Gnostics, in opposition to the heretics of the same name; affirming, that the true Gnostic is grown old in the study of the holy scripture; and that he prefers the orthodox doctrine of the apostles, and of the church; whereas the false Gnostic abandons all the apostolical traditions, as imagining himself wiser than the apostles.

At length the name Gnostic, which originally was the most glorious, became infamous, by the idle opinions and drollary lives of the persons who bore it; much as, in the present age, it has fared with the name quidst, aper, &c.

GNU, in Zoology, a species of Antelope, having horns thick, rough, and bent much forwards at the base, then suddenly turned backwards, a ferruginous body, a neck with a mane, and a tail whitish. This animal inhabits the country of the great Namaques, to the north of the Cape of Good Hope. It feeds in large flocks in the plains; is exceedingly fierce, very swift, and fights with its horns; it frequently drops on its knees, runs quickly in that posture, pursuing the ground with its horns and legs. It is a singular animal, having the body like a horfe, with a thick buffalo-like head, elegant taper legs like a deer, and the lachrymal furrows of the Antelope tribe. It is about 6 feet long, and 3/4 high at the shoulders; of a rufby brown colour, having its hair tippd with white, but on the breast and forelegs long and black; the head is large and clumsy, with a square mouth and broad flaps over its nostrils; on the chin and gullet is a long hanging beard, or bunch of white hairs; the neck is short, thick, and somewhat arched, with an erect ash-coloured mane; the tail is long, white, and flowing like that of a horfe; the feet have only one spurous hoof on each. The fleece is reckoned very good.

GO sometimes used in Laws, in a special signification. Thus, to go without day, and to go to God, denote as much as to be dissolved the court, and to be acquitted.

GOA, in Geography, an island in the East Indian sea, near the west coast of Hindostan, seperated from the continent by a river called "Mandora;" about eight leagues in circumference. The soil, especially in the valleys, is fertile; the trees are always covered with leaves, flowers, and fruit; and springs in abundance issue from the mountains. The rainy season continues here from June till September or October; and the land-floods bring down such quantities of mud and sand as stop up the haven and impede the navigation. In the months of April and May the weather is sultry, but from October to March it is very moderate.

GOA, a city and capital of the Portuguese settlements in India, the seat of a vicerey, and see of an archbishop, taken by the Portuguese general Alberquerque in 1516, from a prince of Saracen extraction. The port of Goa is naturally, and still more by the improvements of the Portuguese, one of the best in India; it is fortified with many armed towers, and adorned with abundance of good cannon. Beyond these walls the channel becomes narrow, frightening sometimes to one, sometimes to two miles, and its banks are planted with the beetle fruits and fine trees which India affords. Eight miles up the channel is the town of Goa. About the middle of this distance is a palace, now serving as a barrack for the garrison; and here begins a strong broad wall, two miles in length, which is a footwall when the country is overflowed, and in the vicinity of it a great quantity of salt is collected. This channel, which forms so excellent a port, runs many miles into the country, dividing it into several fruitful islands and peninsulas, which plentifully furnish the city with necessaries. Adjoining to this port is the haven of Mormugao, formed by the other channel, that runs between the island of Goa and peninsula of Salsete, and affords a safe retreat to the Portuguese and other ships, when they are shut out of the port by the floods which are brought down by the river Mandora, in consequence of the heavy rains of June, and till the passage is opened in October. The port of Mormugao is defended by a castle and island on the island of Salsete, and a good garrison.

At the south entrance into the channel are the ruins of Old Goa; and from thence to the new city is a commodious road, elegantly adorned with trees for fruit and shade. The walls of the new city, which is decaying, include a space of 12 miles in circuit; and the public structures that remain sufficiently evince its former grandeur as well as extent. The number of inhabitants is said to be about 20,000; they consist of native Portuguese, Melikos, and Canarines, or natives, who are black as jet, with long black hair, and fine features; here are also many negro slaves, and Pagans of different nations. As to the character of the inhabitants, the men are faith to be, for the most part, proud, indolent, jealous, revengeful, and indigent; the women lazy, lascivious, and as well skilled in poisoning as any in the world:—215 miles S.S.E. from Bombay. The inquisition, formerly existing in this place, is now abolished. N. lat. 15° 28' 20".

E. long. 73° 45' 47''.

GOA, or GOA, a kingdom on the west and south-west coast of the island of Celebes, which after many conquests and revolutions, is now dependent on the kingdom of Boni. The capital of the same name stands on a little island, on the banks of a river, whence the kingdom derives its denomination. It was built about the same period as Samboupo and Tello; and was taken by the Dutch in 1778. S. lat. 5° 12'. E. long. 119° 51'.

GOACHIO, a town of Peru, in the diocese of Lima, near the Pacific ocean; 65 miles N.N.W. of Lima. S. lat. 11°.

GOAD, in Rural Economy, a term applied to a pointed instrument, by which oxen are driven when employed in team-labour. It has frequently, likewise, a leather thong attached to the contrary end of it, so as to form a form of whip.

GOAFFI, in Geography, a town of Africa, in the kingdom of Mandingo, on the Senegal.

GOAHIROS, a nation of South America, situated between the jurisdiction of Maracaibo and the Rio de river
de la Hache: they occupy the coast for more than 30 leagues, and extend equally far into the interior part of the country. They have at all times been considered as the most ferocious of the maritime Indians. The Spaniards never even attempted to conquer them. Some missionaries have made efforts for instructing and proselytizing them to the Christian faith, but without any permanent effect. Their number amounts to 30,000. They are governed by a cacique, for whom they have erected a citadel upon a small eminence, called "La Teta," the Pop; at the distance of some leagues from the sea. They breed horses upon which they ride with incredible rapidity. Their troops are all mounted, each soldier carrying a carbine, cartridge-box, bow and quiver. They experience much friendship from the English of Jamaica. They affil them with advice, and supply them with arms. Their marauders have rarely any communication with Maracaibo, because, as its jurisdiction is the principal scene of their robberies and atrocities, the inhabitants are obliged to be continually on their guard, so as to be always ready to repel the aggressions of such troublesome neighbours. The Spanish city to which they chiefly resort is Rio-de-la-Hache, depending upon the viceregalty of Santa Fé, where they barter their commodities. They set out in bands, most commonly preceded by their wives, who carry their children upon their backs, besides other loads, too heavy even for beasts of burden. Dreading impostion, they have never adopted the use of specie, but barter their horses and oxen chiefly for spirituous liquors, to the use of which they are much addicted. Urged by their necessities they recur to arms, and threaten the nearest city or village. After some harrassments, the Spaniards sue for peace, and obtain it in consideration of some pipes of brandy and other smaller articles. Although these Indians are well received in the Spanish cities, they will not admit any Spaniard into their country; and yet some Spanish smugglers contrive, for pecuniary considerations, to obtain a passport and escort for travelling the country of the Goashiros, and they have thus acquired many partizans among the Spaniards themselves; but their principal and most useful connection is formed with the English of Jamaica. By them they are supplied, not only with arms and ammunition, but with the fluffs that clothe them. Their dress is ornamented by a great variety of feathers, fragments of shining metals, and gold ridiculously fixed to their ears, nose, and arms. The articles with which they furnish the English in exchange for the merchandise they receive are pearls, which they sell in their own ports, and horses, males, and oxen. Their ferocity is such, that even the English will seldom go far confide in them as to venture on shore, but the buccaneers of bartering is transacted on board, and the ships hasten to depart. The ships that are accidentally call upon the coast, immediately become the prey of these cannibals, who massacre the crew and devour their flesh; dividing the cargo among those whom they are present on the occasion. The Goashiros are said to be a formidable nation, well mounted, armed, and disciplined and able to bring into the field 40,000 effective men.

The eastern part of the island of the Goashiros are the "Canaan" Indians, who live like savages, but are so cowardly and pusillanimous as to allow the Goashiros to exercise an authority, which the bold always acquire over the timid. These savages are, in fact, merely the slaves of other savages. Depoer's travels, vol. i.

GOAL. See GAO.

GOAL-FETCH, a name sometimes applied to the summer wheat. See FARE and WITCH.

GOARING, or Ship-board. The farmers lay a fail is cut earliest, when it is cut Hoping for degrees, and is broader at the elve than at the ear-ring, as all top-fails and top-gallant-fails are.

GOAS, in Geography, a town of Bengal; 11 miles E. of Moorshedabad.

GOAT, in Zoology. See CAPRA.

GOAT, in Rural Economy, is an animal, that in particular situations may be kept with advantage by the farmer, as where the country is rocky and barren, and there is little keep for any other sort of animal. The goat is capable of climbing the steepest rocks, and of browsing upon the briars, heath, and shrubs of several different kinds, which are rejected by other sorts of animals. When turned into pasture grounds they shoult confequently be prevented from nipping the young shoots of trees and other woods, as they prefer them to the graps.

They are beneficial in several different points of view, as in their milk, which they afford plentifully, and which is of a very excellent quality. In some cases, this and cow's milk are mixed together, and a highly valuable cheese prepared from them.

The young kids are likewise very excellent food, and two or three are frequently brought forth at a time, often twice in the course of the year.

The hair of the goat is also very valuable for different purposes, as the making of ropes to be used in the water, which are extremely durable. A fort of fluff is also formed from it in some places. It may be sheared in the same manner as wool from the sheep.

The fleece of the goat is excellent, the animals being in some places, as in Cumbrovantho, killed merely for the object of their skin, which is capable of being made into candles of a superior quality to those of the common kind.

Their horn constitute valuable handles for rakes and pen-knives. The skin of the young kid is well suited to the glove manufacturer, from its taking on a dye better than any other sort of skin. The old skin is highly useful also, being in many cases preferred to that of the sheep; besides, the fluff affords a cheap and abundant food for the winter months, especially when the kids have been fed early to market. The bitches of the goat are often salted and dried, and supplied all the uses of bacon; and are known by the Welch under the name each yr eden, or hagg venison.

In cleaning goats for keeping, the following directions should
should be attended to. The male should have a large body, with long hair, and straight stiff legs; the neck should be plain and short, the head small and slender, the horns large, the eyes prominent, and the beard long.

The female ought to have a large udder with well fixed teats, and with none or very small horns.

Goats are bell kept in flocks, in order that they may have the use of a sash to scrape and rub; and they should have good fodder both for summer and winter, great heat and cold being equally injurious to them.

The period of coupling is about December. They are mated and kept without litter in the winter season, in clean paved places or other places.

The kids may be prepared for the table in a manner similar in some degree to that of the lamb.

They have been vulgarly supposed useful in stables from the disagreeable odor that issues from the males at particular seasons, but there are probably no real grounds for such a conclusion.

Goatfish, Capereusus, in Ichthyology, the name of a fish, called also by some Caper. It is a species of Ballistes.

In the middle of its back it has three very strong and large prickles, the first of which is three times as large as any of the others, and all are connected by a membrane.

The whole fish is covered with a scaly skin, but the fishes have the appearance of those of a great and small of the fish; for they are placed in cannulated lines intermixing one another, and are so well fixed, that they with difficulty come off; and wood or ivory may be polished with the skin, as with the common fish-kin and by the turners, &c. It is of a blue-green colour, spotted with a fine blue, and the back and belly fins are black, with some blue and red spots. Its whole figure is very broad and flat, as well as short, so that it approaches to a round form. It seldom exceeds two pounds in weight. It is caught in the Mediterranean, but not commonly. The skin of it is frequently found in the cabinets of the curious.

Goat Island, in Geography, two small islands near the S. coast of Jamaica, they are denominated Great and Little; the former is situated in N. lat. 17° 33'; E. long. 76° 51'; and the latter about a mile N. W. from it.

Goat Island, the southernmost of the Bathie islands, in the East Indian sea. N. lat. 25° 0'; E. long. 121° 26'. Also, a small island among the Philipines, near the S. W. coast of Luzon. N. lat. 13° 52'; E. long. 120° 13'. Also, a small plot of America, in the West Indies, called the island of the Fort of Rhode island, opposite to the town of Newport, and which is Fort Washington.

Goat's Beards, in Botany. See Tragopogon.

Goat's Eye, in Surgery. See Eye.

Goat's Horns, petech'd. In Dr. Grew's "Rarities of the English Colleague," p. 255, a Tephritus besti, or goat's horn, in that collection, is described as broken at both ends, about six inches long, and 2½ inches across at the broadest part, the belly an inch over and furrowed, the back somewhat edged, of an athen colour, inwardly blueish grey, outwardly mixed with oblique and white streaks, banded, one end thicker than the other: it is added, that such are found in Germany, Moravia, Siberia and other parts, and efervescence with nitric acid.

In the Analysis of the Labours of the French national Institute for 1809, it is mentioned that M. Cuvier in the affinial fields near Etampes had discovered horns, some of which do not seem to differ essentially from the horns of the existing species of goats. The evidence in neither of the above cases, or any other which we have seen, is sufficiently strong to prove the fowl horns of this class to have really belonged to goats; and analogy would justify us rather, in referring them to the extinct race of animals, the only, and vegetables with which the plants are so abundantly found, in some parts of the series.

Goat's Rue. See GALEGA.

Goat's Ticks. See SCALE-GOAT.

Goat's Strokes. See CAPPULARIS.

Goat's Stones, greater. See SATYRUM.

Goat's Stones, lesser. See Orchis.

Goat's Thorn. See ASTRAGALUS.

Gosfield, in Geography, a mountain of Scotland, in the island of Arran; the summit of which is 2840 feet above the level of the sea.

Gosford, Grand, a town of the island of Kipsinola: 10 miles S.W. of Leogane.

Gosford, Petit, a sea-port town of the island of Kipsinola, with a harbour capable of receiving vessels of the largest size safe from winds; in its environs are plantations of sugar, coffee, indigo, and cotton. The town is the emporium to which the inhabitants of Grand Gosford, and other places, lend their commodities; 20 miles W.B.W. of Leogane. N. lat. 18° 26'. W. long. 73° 37'.

Gobi, a town of Persia, in the province of Chaffitan; 75 miles S. of Sufur.

Gobbin, or Goblie, a small island in the mouth of the Euphrates, or Shat el Arab, at the entrance into the gulf of Persia, with a town upon it; 50 miles E.S.E. of Babara. N. lat. 30° 10'. E. long. 48° 25'.

Gobranium, in Ancient Geography, a town of Bithia, placed in Antiochus's Itinerary between Barrium or Ull, and Magnis or Kechelber, 12 miles from the former and 22 from the latter, and supposed to be Abercagnyn, which fea.

Gobbi, in Geography, a country of Africa, between that of Commara, and Cape Lopez Goufello; the chief trade of which consists in elephants and ivory. The chief town is about a day's journey distant from the Atlantic. N. lat. 1° 30'. See Camma.

Gobbins, in Mining, is a name with the colliers of several districts for the bulking stuff and other refuse of their works; as also for the hollows or spaces behind them, into which they throw the refuse coal, earth, and stones; which last are also called walls and old-hollows. In the coal-pits about Weddavby in Staffordshire, and at Donithorpe, Donby-Hall, &c. in Derbyshire, the gobbi take fire spontaneously after some time, unless the air is excluded from them, owing to dams, tow, taw, or earth, a thin stratum found near the coal, which heats, fumes, and spontaneously inflames, by the contact of air and moisture. At Donithorpe they encase their gobbbins in walls of tempered clay at certain distances, for excluding the air.

Gobbs, otherwise Cobbles, are pieces of coal from the size of walnuts to that of a man's fist or larger, which are occasionally picked up in the hill or refuse small coals at the colliers, either by poor perfons, who are allowed to do so, or for sale. These are what in London, and many places in the east and south of England, would be called round-coals and highly valued, on account of the absence of very small or dust coals among them. Where the rage among the buyers and dealers is for large coals, as about Weddavby in Staffordshire, and the Erewhon vale in Derbyshire and Nottinghamshire, an inconsiderable wall is made of cobbles and fluy; in working the thick coal about Weddavby, a heap of such, fix or seven yards thick, is laid to be left and walled on the floor of their works; and
and to occasion a further wake of a rib or wall of cold coal, round each hall or chamber, for excluding the air, which would otherwise fire these wake heaps. See Gobins.

GOBELINS, a celebrated manufactory, established at Paris, in the Faubourg St. Marcel, for the making of tapestry, and other furniture for the use of the crown. The house where this manufactory is carried on was built by two brothers, Giles and John Gobelin, both excellent dyers; and the first that brought to Paris, in the reign of Francis I., the secret of dyeing that beautiful scarlet colour still known by their name; as well as the little river Bièvre, on whose banks they fixed their dye-house; and which is now known by no other name than that of the river of the Gobelins.

It was in the year 1667 that this place, till then called "Gobelin's Folly," changed its name into that of "Hotel Royal des Gobelins," in consequence of an edict of Louis XIV. Mons. Colbert having re-established, and with new magnificence enriched and completed the king's palaces, particularly the Louvre and Thilleries, began to think of making furniture suitable to the grandeur of those buildings; with this view he called together all the ablest workmen in the divers arts and manufactures throughout the kingdom; particularly painters, tapestry-makers, sculptors, goldsmiths, chisellers, &c. and by splendid offers, pensions, privileges, &c. called others from foreign nations.

And to render the intended establishment firm and lasting, he brought the king to purchase the Gobelins, for them to work in, and draw up a system of laws, or policy, in seventeen articles.

By these it is provided, that the new manufactory shall be under the administration of the superintendent of the king's buildings, arts, &c. that the ordinary masters thereof shall take cognizance of all actions and proceeedings brought against any of the persons in the said manufactory, their servants and dependants; that no other tapestry work shall be imported from any other country, &c.

The Gobelins has ever since remained the first manufactory of this kind in the world. The quarter of the finest and noblest works that have been produced by it, and the number of the best workmen bred up therein, is incredible; and the present flourishing condition of the arts and manufactures of France is, in a great measure, owing thereto.

Tapestry work, in particular, is their glory. During the superintendence of M. Colbert, and his successor M. de Loustois, the making of tapestry is said to have been practiced to a degree of perfection, scarce inferior to what was before done by the English and French.

The battles of Alexander, the four seasons, four elements, the king's palaces, and a series of the principal actions of the life of Louis XIV. from the time of his marriage to the first consort of France, Comte, done by the designs of M. Le Brun, director of the manufactory of the Gobelins, are master-pieces in their kind.

GOBEMOUCH, the fly-catcher lizard, a species of American lizard that is always employed in catching of flies. It is the smallest of all the lizard kind, and is very beautiful, its skin often appearing as if covered with leaves-gold, or leaf-silver, and in some others of a green, or red and gold, wonderfully bright and beautiful. They are not at all shy or fearful of men, but as they do not hurt, if they feel to dread none; they enter chambers and closets, and do no sort of damage, but destroy the flies and other troublesome vermin they find there. Their whole lives seem spent in the chase of these insects, and it is a very pleasing thing to observe the various ways they have of catching them. They are very cleanly creatures, and may be suffered to run over the table at meal times; and, if they see a fly, they will pursue it over the very hands or cloaths of people, or over the dishes, without doing the least hurt.

Notwithstanding their great beauty while alive, they are only a dudley grey when dead, all their other colours immediately vanishing.

GOBEMOUQUE, in Ornithology, a name given by Buffon to several species of Linnæus, Todius, Turdus, Melitophus, and Melascula, which fee respectively.

GOBIN, Sr., in Geography, a town of France, in the department of the Aine; celebrated for its manufacture of plate-glass; 4 miles S. of la Ferre. See Glass.

GOBIO, in Ichthyology, a species of Cotton; and also of Cyprinid, which see respectively.

GOBIUS, a genus of the thoracic order, possessing, according to Linneus, the following essential character. Head small, eyes approximately with two pedicles between; gill-membrane four-rayed; body small, compressed on each side, covered with small scales; and furnished with a small tubercle behind the vent; the central fins united into an oval or funnel shape; and the dorsal fins two in number.

At the time Linneus wrote his Systema Naturae, the above character was probably found sufficiently explicit to embrace, in a correct and lucid order, all the species of this natural tribe of fishs at that period known. This, however, it must be confessed, is not precisely the case at present. The number of species has been materially augmented by the recent discoveries of naturalists; and among these are certain kinds which exhibit differences essentially dissimilar from each other; but still, in the idea of the Linnean student, they can be only referable to the genus Gobius; while others, no less intimately allied, cannot, without a palpable innovation on the order of nature, be consigned to that genus. The later French writers, as Latreille, Bore and others, after the example of Lacépedé, divide the Linnean Gobius, and their natural affinities, into four distinct genera, namely, Gobius, Gobioidea, Gobiosoma, and Gobionotus, an extension perhaps requisite, or at least admissible. This extension is, indeed, in our own opinion, render desirable, and we refrain from adopting it only to avoid that degree of perplexity which might probably result from the dispersion of the species into the several distinct articles, which would then become necessary. For this reason, we propose to concentrate the whole in one point of view, observing only to refer the species respectively to their different genera as we proceed, and by this means leave it to the judgment of the reader, whether those recently established genera ought to be in reality considered essentially distinct, or as only constituting the natural subdivisions of the Linnean genus Gobius.

The habits of these fishes in general appear to correspond, they are chiefly inhabitants of waters contiguous to the shores, and lie concealed among the rocks, under stones, or in the sand and mud of lakes and rivers: they feed on worms, insects, and the spawn and fry of fishes; and adhere firmly to the rocks or other hard substances, by means of their ventral fins.

Species.

Gobius Gobius.—Central fins united; dorsal fins two.
† Section. Pectoral fins attached close to the body.

Boddaerti. Rays of the anterior dorsal fin cirrhi, the third very long. Pullus.
GOBIIUS.

A native of the Indian seas, in common about six inches in length, and never exceeding eleven or twelve inches. The head thick, blunt, and somewhat convex, with spots of brown and white; crown convex, and gradually sloping down; jaws of nearly equal length; lips thick and flethy; eyes vertical and oblong; gill-membrane lined. The body is rather convex, tapering slightly towards the tail, and covered with small and soft scales; the colour bluish brown above, beneath pale yellow, inclining to white; the back marked with a longitudinal series of seven brown spots, beneath which, on the sides, are four other spots of the same colour, but these latter are speckled with white; the vent, which is situated rather nearer the head, is surrounded by a black circle, behind which is a conic peduncle. The dorsal fins are bluish black, the first including five rays, has the membrane spotted with white; the membrane of the second is remarkable in having fixed white lines between each ray, these rays are feta-

ceous, and amount to twenty-five in number; the pectoral fin is roundish, and includes twenty-one rays; ventral, thirty-
four; anal, twenty-five; and the tail, which is bluish white, slighted rays.

LAGOCOEPHALUS. Upper jaw hemispherical; no tongue and lateral line. Pallas.

The native place of this species is uncertain; it was first described by Kolreuter, in the Transact. of the Royal Academy of Peterburgh, and afterwards by Pallas in his "Spezies von Skandinavien." The head is short, thick, and delituate of scales, the mouth transversel; eyes dilute, small, and covered witha common skin; upper jaw very thick, the lower with a few larger teeth, which are a little hooked; the lips cleft in the middle, doubled, the upper flethy and very thick, and also reaching much beyond the jaw; palate with numerous crowded teeth of small size on the margin. The body round, compressed towards the tail, of a grey or brown colour, and covered with minute scales; vent in the middle of the body. The first dorsal fin contains five rays of a simple form, the rays in the second fin, like those of the tail, are branched, and amount in number to eleven; the pectoral fin lanceolate oval, with fifteen rays; ventral, with eight short crowded rays; anal, ten rays; and caudal, twelve. The total length of this fish about three or four inches.

CYPRINODUS. Body covered with large sub-ciliated scales; tail rounded; the membrane connecting the rays tej-

celled with brown. Pallas.

About the size of a finger, the body of a compressed form, thickish, convex, grey brown above, beneath whitish; skin folt and ciliated with fine lines; teeth minute and nearly equal; tongue flat, soft, and obtuse; eyes lateral and between them a blackish semi-lanceolate eel; rays of the fins mostly branched; lateral line obsolete. The species inhabits Amboulo.


Inhabits the brooks and rivers of Martinicne, where Plu-


mer saw it in great abundance. The body is oblong, and covered with round, lubricated scales, which are longer on the posterior part. The head is long and truncated; the eyes vertical with black pupil, and golden iris; jaws equal; tongue flat and acute; cheeks bluish edged with red; lateral line in the middle of the body, and the vent nearer the head; dorsal and anal fins with simple, soft, distant rays, connected by a thin membrane; rays of the first dorsal membrane extended far beyond the membrane; between the dorsal fins on each side a brown spot; pectoral fin yellow edged with blue; tail at the base greenish yellow, the edge violet. The flesh excellent.

MINUTUS. Whitish, spotted with ferrugineous; rays of the dorsal and caudal fins obfuscely streaked with the latter. Donov. Gobius minutus; albicans ferrugineo-unicalciatus, radiis dorso dissectis, et caudalis ferrugineo obsolto fimbriatus. Pallas. Mi-


nute or spotted goby. Pennant.

"The minute or spotted goby is a pretty, delicate, little creature, whose usual length very rarely exceeds two inches and a half, or at the utmost three inches. Pallas, who describes this species, defines its character with much precision; he speaks especially of the obfuscely streaks across the rays of the two dorsal fins and tail, which are sufficiently distinct, except when the fins happen to be considerably expanded, at which time they indeed appear as to many series of unconnected dots. These streaks or dots are uniformly confluent in all the specimens of the fish that have fallen under our observation, varying a trifle only in the tint or density of colour.

"Block does not include this species in either of his works on fishes. Pennant considers it as the Gobius aspila of Linnaeus, in which particular later writers are unhappy; it must however be confessed, that there still remains some little doubt as to the precise difference between the aspila and minutus; Linnaeus tells us the former has the body and fins barred with brown, and this will, in a certain degree, apply to the characters of minutus. That the spotted goby is the minutus of Pallas cannot admit of doubt.

"It has been imagined, on the authority of Mr. Pennant, that the spotted goby appeared on our coasts only during the summer months, and was besides extremely local. This idea is certainly unfounded, for we have received them from various parts of the sea-coast in all seasons of the year. In the wide sweep of lands, called 'Traeth Lleven,' which extends along the south side of Beaumaris bay; upon the shores of the Severn; and also many other of our sandy coasts, this diminutive fish has attracted our remark swimming or lurking among the shrimps in the shallow pools left by the sea at ebb-tide. The same species is likewise not unfrequently captured with the sprats, at a short distance from the shore.

"In the first dorsal fin are five rays, in the second eleven; the pectoral fin contains twenty rays; the ventral, nineteen; anal, eleven; and tail sixteen."

We have been the more explicit in detailing the character and history of the spotted goby, in order to enable the reader to comprehend the precise difference between this and the following species.


Described as a very small species found in the Nile and some parts of the Mediterranean; the length about an inch. The first dorsal fin, as in minutus, contains six rays, the second sixteen or seventeen; pectoral, according to Linnaeus, eighteen, or one less, as Artedi mentions. Linnaeus fixes the number of rays in the ventral fin at twelve, Artedi at six only, and in describing those of the anal fin they differ again, these being, as Artedi informs us, no more than eleven, though Linnaeus says they amount in number to ten less than four and twenty-five in number. Linneus.

JOSA Rays of the dorsal fin fetaeous, and extending above the membrane. Linnaeus. Josa, Salv. Gobius altius, Ren-

del. Gobius turrbus, Wits.

This is an inhabitant of the European and Mediterranean seas; its length is from four to six inches; the body above brown, beneath whitish, and the whole covered with scales. The head is compressed; pupil of the eye black with the iris white; the back slightly arched; jaws of equal length, and armed with numerous small teeth; the lateral line.

straight,
straight, blackish, and placed in the middle of the body. The colour of the fins, which is blue, confluates, according to Bloch, the characteristic distinction of this particular species. Its haunts are the sandy shores of the sea, and its food teleftaceous animals, crabs, and other marine creatures. Though highly prolific, it is observed not to multiply very fast, its eggs being eagerly sought after by the larger kinds of fishes. The flesh is indifferent, being hard and meagre.

**Eleotris.** Anal fin with nine rays; tail roundish. *Lageriroluem.* *Gobius Chinenis.* Olebeck.

Whitish, covered with large, round, and smooth scales, and marked on the back near the Gill-covers with an ample violet spot; both the dorsal fins of equal height, the first containing six rays, the second eleven; pectoral fin twenty; ventral, ten; anal, nine; and tail ten. The species inhabits China.

**Pectinrostris.** Teeth in the lower jaw horizontal. *Gmel.—Lageri. Apocryptes Chinenis.* Olebeck. A fish of small size found in China; the first dorsal fin contains five rays, the second twenty-five; pectoral, nineteen; ventral, twelve; anal, twenty-five; and caudal, fifteen.

**Bicolor.** Fuscous; all the fins black. *Linn.—Brünn pifs.* Length from three to four, or rarely exceeding six inches, and inhabits the Mediterranean sea. The rays of the fins project very incomparably above the connecting membrane.

**Centarius.** Mouth putulata with red; rays of the dorsal fins reaching above the membrane. *Brünn.*

About a span in length, the mouth, Gill-covers, chin, and fins putulata with fanguienne red spots; behind the eyes a tranverse membraneaceous line, and two others placed longitudinally before the dorsal fin; fins generally brownish, with facetaceous rays; pectoral rounded; ventral, bluish, with the rays split at the end; tail pointed and lightly banded with black. *Gmelia* is inclined to think this may be only a variety of the species *Zojo.*

**Pagonellus.** Tail and second dorsal fin purplish at the base; the first dorsal fin edged with a yellowish line. *Linn.* *Gobius pagonellus.* Hauffelqufl.

Length three, four, or six inches; the body slightly compressed and whitish, with a green tinge, and marked with blackish dots or small spots. Native of the Mediterranean.

**Arabius.** Five posterior rays of the first dorsal fin terminating in a red filament twice the length of the membrane. *Fork.*

Native of Djidda in Arabia. The body is about the size of the little finger, and of a greenish-brown colour, with numerous confluent violet spots and specks of blue; fin soft and covered with minute firm scales; fins spotted; tail cuneated.

**Nerolus.** Second ray of the first dorsal fin ending in a black filament twice as long as the body. *Fork.*

Inhabits the same sea as the former, and nearly the same size; body whitish, with brown confluent spots, beneath white without spots; scales rhombic and rigid; pectoral fins glaucous, with obsolete brown spots at the base; ventral brownish; dorsal fin and tail transparent, dotted with brown; anal fin hyaline, with the outer edge black.

**Plumieri.** Upper jaw prominent. *Blüch.*

This, according to Plumier, inhabits the rivers of the Antilles in great numbers, and is in much esteem for the table, its flesh being of good flavour, and very wholesome. The body is round, fleshy, above tawny, yellow on the sides and white beneath; the whole covered with small scales; head large; vent in the middle of the body; lateral line straight; fins yellow; pectoral and caudal yellow at the edge, with branched rays; dorsal and anal with ample rays.

**Celtaris.** Upper jaw longer; first dorsal fin fixed, with a black ocellated spot near the base on the posterior part. *Broussonet.*

Found in the fresh waters of Otaheite. The head is rather compressed, sub-conic, blackish, above slightly curved, obtusely carinated in the middle; teeth unequal, and minute, those of the lower jaw smaller; body compressed, lanceolate, covered on the posterior part with imbricated, ciliated scales, and obscurely clouded with olive and black; beneath glaucous.


Native of the European and Asiatic seas. Length six to nine inches; colour blueish black, varied.

**Boscii.** Body and tail grey, speckled with brown; the former marked with seven transverse whitish bands. *Lacépède.* Described and figured in the work of Lacépède, on the authority of Bosc, who observed it on the coasts of North America; it grows to the length of four inches; the head is broader than the body; the first four rays of the anterior dorsal fin terminate in a filament; and the body, which is smooth, is apparently without scales. The flesh is never eaten.

**Carulus.** Body blue; caudal fin red, with black border. *Lacépède.*

Inhabits the seas on the eastern coasts of Africa, where it was observed by Commeron, who describes its appearance in the water; when the sun shines, as splendid in the highest degree, though its size is small, the total length not exceeding three inches. The first dorsal is somewhat triangular, with the rays terminating in the fins, the second contains fourteen rays, the filamentous appendice of the tail ray in which is thrice the length of the rest. The flesh is not eaten by the natives, but is used as bait in fishing.

**Sect. Pectoral fins attached or placed on a fleshy process or elongation.**

**Schlosseri.** Blackish-brown, beneath whitish; rays of the first dorsal fin spinous. *Pallas.* *Schlosseri goby.*

This is about a span in length, the body, rather compressed, decreasing in an inconconsiderable degree towards the tail, and covered with large round corious scales; the head long, much thicker than the body, and sloping in front; the mouth transverse; lips thick, fleshy, granulous within, and the upper one folded; teeth large, unequal, dilated, and irregularly alternate; palate fleshy; tongue thick, soft, and fleshy; the eyes vertical and placed forward, protuberant, the pupils turned to the sides with a large lunar cavity beneath each; Gill-covers oblong and fleshy; tail ovate-acute; and the vent in the middle of the body. In the first dorsal fin are eight rays, in the second thirteen; pectoral, sixteen; ventral, twelve; anal, twelve; and tail nineteen. The species inhabits the fresh waters in the island of Ambaima, generally retiring in the soft mud at the bottom, and subsisting on worms; the flesh is excellent. The same fish occurs also in many parts of China. In the Gymnolius Syn. Nat. The species is described under two dillicent names, Ichtholiferi and barbatus, the latter of which Linnaeus defines as having the pectoral fins fan-shaped, and the first dorsal fin with twelve rays, the second thirteen. *Lacépède,* Bosc, and other late writers agree in considering them the same.

**Genus Gobius.**

Ventral fins united; dorsal fin one; head small; Gill-covers closed nearly throughout their contour.

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Described by Gmelin on the authority of Broussonet's Ichth. dec. 1.; it is mentioned as a small species, the habitat of which is unknown. Bosc believes it was brought from the South sea.

AMGUILLARI. Dorval fin single; tail red. Gmel.

The general figure of this species is somewhat anguilliform, or shaped like an eel, and like that: first the body is fat and slippery; the teeth are small, and project out of the mouth; the dorval and anal fins are large, and extend to the tail, with the fin of which they are united; the colour of the body is pale brown, of the fins red; the first dorval fin includes fifty-two rays; the pectoral, twelve; ventral, ten; anal, forty-three; and tail twelve. The fish is a native of the coast of China and other parts of India.

Smyrnesius. Edge of the jaws formed of a bony plate, and delicately of teeth. Lacépede.

Described on the authority of the new memoirs of the Transactions of the Academy of Petersburg. It is a native of the Mediterranean; the skin very vivious, and the dorval fin furnished with forty-three rays.

Broussonetii. Body very long and compressed; tail elongated. Lacèpede.

Supposed to be a native of the Indian seas. The example described by Lacèpede appertained to the fladhooler's museum. The dorval fin contains thirty-three rays, and extends nearly to the tail, as does likewise the anal fin; the body nearly transparent, and the jaws furnished with small teeth.

Genus Gobiomorphae.

Head small; eyes approximated; gill-covers closed nearly throughout their contour; dorval fins two.

* Section. Pectoral fins connected close to the body.

STRIGATUS. Ventral fin divided; first caudal fin six-rayed. Broussonet.

Native of the Pacific ocean, near Otaheite. The head is composed, yellow, streaked and spotted, and greenish yellow above; body composed, lanceolate and covered with imbricated, subquadrated, and slightly crenated scales; colour pale blueish-green; beneath whitish, with brownish streaks behind the pectoral fins; beneath the lateral, on the hind part, varied with oblique reddish spots; first dorval fin green, with red rays and four fillets of the latter colour; the second dorval fin with nine red fillets; pectoral fin pale green, the marginal rays shorter and bimple; ventral whitish; anal long, greenish-red; tail round-oval, yellowish-green, the rays red and bimple, with a broad oblique, slightly curving reddish fillet each side.

DORMITOR. Upper jaw longest; tail rounded. Lacée pede.

Described from the drawing of Plunier, who saw it in the fresh waters and rivers in the marishes of South America. The second dorval fin contains eleven rays, and each of the pectoral fins eight.


Inhabits the seas of South America. The body is silvery above, black, and spotted on the sides with black; feathers small and imbricated. The head of this species is naked; eyes large and lateral; mouth narrow; teeth equal, in the jaws and palate; tongue rounded, thin, smooth; gill-covers smooth and roundish; back a little convex; lateral line curved and parallel to the back; vent in the middle of the body.

** Section. Pectoral fins attached or placed on a flesh process or elongation.

KOELREUTHERI. Ventral fins divided; first dorval fin with eleven rays. Pallas.

Length about nine inches, the body soft, fat, and whitish-grey; head long, thick, and convex in front; eyes on the top of the head; lips doubled and fishy; teeth unequal, conic, the anterior ones larger, and one larger on each side of above the aperture of the gills nutated; lateral line impressed; vent about the middle of the body with a peduncle behind; fins soft; the first on the back large and brown, with a black terminal band, the rays from the second narrower, yellowish, with a longitudinal deep brown band, and branched rays; pectoral fan-shaped or oval, and placed on a broad pedicle; tail oval and lanceolate, with naked rays.

Genus Gobiomorphae.

Head small, with the eyes approximated; gill-covers closed nearly throughout their contour; dorval fin one.

PROBUS. Ventral fins divided; lower jaw longer. Gmel. Asper fusca, Pflü.

A small species found in South America. The head is depressed and covered with scales in size equal to that on the back; the mouth furnished with several rows of teeth; and the tail rounded.

Gobius After, a name given by Geyer and others to a species of perch called by many after pöciculus, a name confounding it with many other similar fishes, and by Linnaeus pera after. It is distinguished among the perch tribe by Arteri under the name of the perch with eight or nine black lines on each side. See Perca.

Gobius Ehrensi, or Gudjon. See Cyprinus Gobius.

Gobius Mariae, or Goger. See Gobius Niger.

GOBLET, or Goblet, a kind of drinking cup, or bowl; ordinarily of a round figure, and without either foot or handle.

The word is French, goblet; which Salmasius, and others, derive from the barbarous Latin cupa. Budæus deduces it from the Greek κυριά. a cup.

Gobletts, made of the wood tamarisk, are ranked among medicinal drugs; because the liquors infused a while therein, are supposed to acquire a quality which renders them good in diseases of the spleen.

GOBONE', or Gobony, in Heraldy, the name as companion.

Gobyganoe, in Geography, a town of Bengal; eight miles S. E. of Goragot.

GOCEY, a town of Hindoothan, in Allahabad; 30 miles N. of Gazypour.

GOCH, a town of France, in the department of the River, and chief place of a canton, in the district of Cleves, situated on the Niers, surrounded with walls in 1291, and containing three churches; six miles S. of Cleves. The place contains 2412, and the canton 12,728 inhabitants, in 19 communes.

Gochlenius, Rodolphus, in Biography, a physician, was born at Wittenberg in 1525. His father was professor of logic at Marburg, where the subject of this article: studied medicine, and obtained the degree of doctor in May, 1601; and was himself elected professor of philosophy in 1603, and also professor of mathematics in 1612. He died on the 2d of March 1621, at the age of 49. Although his life was not long, by extreme industry he had written a considerable number of treatises, in which he evinced much of that erudition and sagacity, of which he was a zealous follower. It is unnecessary to enumerate the long list of titles to his works, which relate to philosophy, mag-
M. Hallenberg, a Swedish writer, in a work published at Stockholm in 1796, and entitled "Difertatio historiae et philologicae de origine nominis Dei God," &c. suggests that the names given by different nations to the deity might denote unity; as the word God itself, by which in all the Tetragrammaton dialects the Supreme Being is denominated.

Philologists have hitherto considered the word God as being of the same signification with God; and this is not denied by M. Hallenberg. But he thinks, that both words originally denoted unity; and that the root is נֵּגֶד אֱלֹהִים, whence the Syr. Ohad and Gada; the Arab. Abd and God; the Peric. edhus and enumas; the Greek αὐθαίρητος; and so the 'Tetragrammaton' the German Gott; and our Saxon God. The other names of God, this author thinks, are referable to a similar origin.

By his immateriality, intelligence, and freedom, God is distinguished from fate, nature, destiny, chance, anima mundi, and from all the other fictitious beings, acknowledged by the Stoics, Pantheists, Spinoists, and other forts of atheists.

The knowledge of God, his nature, attributes, word and works, with the relations between him and his creatures, makes the subject of the extensive science called theology. In scripture God is defined by, "I am that I am; Alpha and Omega; the Beginning and End of all things."

Among philosophers, he is defined being of infinite perfection; or in whom there is no defect of any thing which we conceive may raise, improve, or exalt his nature.

Among men, he is chiefly considered as the first cause, the first being, who has existed from the beginning, has created the world, or who subsists necessarily, or of himself.

Sir IAMB. Newton chooses to confider and define God, not as is usually done, from his perfections, his nature, existence, or the like; but from his dominion. "The word God, according to him, is a relative term, and has a regard to servants; it is true, it denotes a being eternal, infinite, and absolutely perfect; but a being however eternal, infinite, and absolutely perfect, without dominion, would not be God.

"The word God," the same author observes, "frequently signifies Lord; but every lord is not God; it is the dominion of a spiritual being or lord, that constitutes God; true dominion, true God; supreme, the supreme, feigned, the false God.

"From such true dominion it follows, that the true God is living, intelligent, and powerful; and from his other perfections, that he is supreme, or supremely perfect; is eternal, and infinite; omnipotent, omniexistent; that is, he endures from eternity to eternity, and is present from eternity to eternity.

"He governs all things that exist, and knows all things that are to be known: he is not eternity, or infinity, but eternal and infinite: he is not duration or space, but he endures, and is present: he endures always, and is present every where; and by existing always, and every where, he constitutes the very things, duration and space, eternity and infinity.

"Since every particle of space is always, and every indivisible moment of duration every where, the Creator and Lord of all things can never be unanimous, or unguam.

"He is omnipresent, not only virtually, but also substantially: for power without subsistence cannot subsist. All things are contained, and move, in him; but without any mutual passion: he suffers nothing from the motions of bodies.
G O D.

dies; nor do they undergo any resistance from his omnipre-
ence.

"It is confessed, that God exists necessarily; and by the
same necessity he exists always, and everywhere. Hence,
also, he must be perfectly similar; all eye, all car, all brain,
all arm, all the power of perceiving, understanding, and
acting; but after a manner not at all corporeal, after a man-
ner not like that of men, after a manner wholly to us un-
known.

"He is delirious of all body, and all bodily shape; and
therefore cannot be seen, heard, or touched; nor ought to
be worshipped under the representation of any thing corpo-
real.

"We have ideas of the attributes of God, but do not
know the substance even of any thing: we see only the
figures and colours of bodies, in a manner founds, touch only
the outward surfaces, smell only odours, and taste tastes; and
do not, cannot, by any sense, or any reflex act, know their
inward substances; and much less can we have any notion of
the substance of God.

"We know him by his properties and attributes; by
the most wise and excellent structure of things, and by final
causes; but we adore and worship him only on account of
his dominion: for God, setting aside dominion, providence,
and final causes, is nothing else but fate and nature."-Newt.

An ingenious divinity has wrought these thoughts of that
admirable philosopher into form, and ripened them into a
more expres system, in a discourse on this subject. Max-
well's Dis. concerning God.

We shall here subjoin a compendious abstract of the prin-
cipal arguments that have been alleged in proof of the ex-
istence of God. The admirable metaphysician and divine,
Dr. Clarke, has demonstrated this truth, with that clearness
and force of reasoning, for which he is so eminently dif-
tinguished, by a series of propositions, mutually connected
and dependent, and forming a complete and unanswerable
argument in proof both of the being and attributes of the
Deity.

1. Something has existed from all eternity; for,
there being nothing now is, something always was; otherwise
the things that now are must have been produced out of nothing,
and absolutely without cause, which is plain contradiction
in terms.

2. There has existed from eternity some one un-
changeable and independent being; or else, there has been an
infinite succession of changeable and dependent beings pro-
duced one from another in an endless progression, without any
original cause at all. From without, this series of beings
can have no cause of its existence, because it includes all
things that are or ever were in the universe; nor is any one
being in this infinite succession self-existent or necessary, and
therefore it can have no reason of its existence within itself;
and it was equally possible, that from eternity, there should
never have existed any thing at all, as that a succession of
such beings should have existed from eternity. Consequent-
ly, their existence is determined by nothing; neither by any
necessity of their own nature, because none of them are self-
existent; nor by any other being, because no other is sup-
posed to exist.

3. That unchangeable and independent be-
ing, which has existed from eternity, without any external
cause of its existence must be self-existent, i. e. it must exist
by an absolute necessity originally in the nature of the thing
itself, and antecedent in the natural order of our ideas to our
fupposition of its being. For whatever exists must either
have come into being out of nothing without cause; or it
must have been produced by some external cause; or it must
be self-existent: but the two former suppositions are contrary
to the two first propositions. From this last proposition it
follows, that the only true idea of a self-existent, or neces-
arily existing being, is the idea of a being, the supposition of
whole non-existence is an express contradiction; and this
idea is that of a most simple being, absolutely eternal and in-
finite, original and independent. It follows also, that noth-
ing is so certain as the existence of a supreme independent
cause; and likewise that the material world cannot possibly
be the first and original being, uncreated, independent, and of
itself eternal; because it does not exist by an absolute ne-
cessity in its own nature, so as that it must be an express con-
tradiction to suppose it not to exist. With respect both to
its form and matter, the material world may be conceived
not to be, or to be in any respect different from what it is,
without a contradiction. 4 and 5. The substance or essence
of the self-existent being is absolutely incomprehensible by
us; nevertheless, many of the essential attributes of his na-
ture are strictly demonstrable, as well as his existence. The
self-existent being, having no cause of its existence but the
absolute necessity of its own nature, must of necessity have
existed from everlastings, without beginning; and must of
necesary exit to everlastings, without end. 6. The self-
existent being must of necessity be infinite and omnipre-
ent.

Such a being must be everywhere, as well as always, un-
terably the same. It follows from hence, that the self-ex-
istent being must be a most simple, unchangeable, incorrup-
tible being; without parts, figure, motion, divinity, and
other properties of matter, which are utterly inconsistent
with complete infinity. 7. The self-existent being, must of
necesary be but one; because in absolute necessity there can
be no difference or diversity of existence; and, therefore, it
is absolutely impossible, that there should be two indepen-
dent self-existent principles, such e. g. as God and matter.
8. The self-existent and original cause of all things must be
an intellectual being. This proposition cannot be demon-
strated strictly and properly a priori; but a posteriori, the
world affords undeniable arguments to prove that all things
are the effects of an intelligent and knowing cause.
The cause must be always more excellent than the effect; and,
therefore, from the various kinds of powers and degrees of
excellence and perfection, which visible objects possess, from
the intelligence of created beings, which is a real distinct qual-
ity or perfection, and not a mere effect or composition of uni-
teilent figure and motion; from the variety, order, beauty,
and principality, and fitness of all things to their proper and
respective ends; and from the original of motion, the self-
existent creating being is demonstrated to be intelli-
gent. 9. The self-existent and original cause of all things
is not a necessary agent, but a being endowed with liberty
and choice. Liberty is a necessary concomitant of intelligence;
without liberty, no being can be said to be an agent, or
cause of any thing; since to act necessarily is really and pro-
perly not to act at all, but to be acted upon. Besides, if the
supreme cause be not endowed with liberty, it will follow,
that nothing which is not could possibly have been; that
nothing which is could possibly not have been; and that
no mode or circumstance of the existence of any thing could
possibly have been in any respect otherwise than it now actu-
ally is. Further, if there be any final cause in the universe,
the supreme cause is a free agent; and on the contrary sup-
position, it is impossible that any effect should be finite;
and in every effect, there must have been a progression of
causes in infinitum, without any original cause at all. 10. The
self-existent being, the supreme cause of all things, must of
necesary have infinite power; since all things were made
by him, and are entirely dependent upon him; and all the
powers of all things are derived from him, and perfectly sub-
ject
ject to him; nothing can reft the execution of his will. 11. The supreme cause and author of all things must of necessity be infinitely wise. This follows from the propositions already established; and the proof a priori, of the infinite wisdom of God, from the consideration of the exquisite perfection and concomitant excellence of his works, is no less strong and undeniable. 12. The supreme cause and author of all things must of necessity be a being of infinite goodness, justice, and truth, and all other moral perfections; such as become the supreme governor and judge of the world. The will of a being, infinitely knowing and wise, independent and all-powerful, can never be influenced by any wrong affection, and can never be misled or opposed from without; and, therefore, he must do always what he knows fittest to be done; that is, he must act always according to the strictest rules of infinite goodness, justice, and truth, and all other moral perfections, and more particularly, being infinitely and necessarily happy and all-sufficient, he must be unalterably disposed to do and to communicate good or happiness. See Clarke's Demonstration of the Being and Attributes of God.

To this more abstruse argument a priori, for the existence of God, we may add another, more generally obvious, and carrying irresistible conviction, which is deduced from the frame of the universe, and from the traces of evident contrivance and fitness of things for one another that occur through all the parts of it. These confpire to prove, that the material world, which in its nature is originated and dependent, could not have been the effect of chance or necessity, but of intelligence and design. The beautiful, harmonious, and beneficial arrangement of the various bodies that compose the material system; their mutual dependence and subordination; the regularity of their motions, and the aptitude of these motions for producing the most beneficial effects; and many other phenomena resulting from their relation, magnitude, situation, and use, afford unquestionable evidences of the creating power and wise disposal of an intelligent and almighty agent. The power of gravity, by which the celestial bodies preserve in their revolutions, deserves our particular consideration. This power penetrates to the centres of the sun and planets, without any diminution of its virtue, and is extended to immense distances, regularly decreasing, and producing the most sensible and important effects. Its action is proportional to the quantity of solid matter in bodies, and not to their surfaces, as is usual in mechanical causes; and, therefore, seems to surpass mere mechanism. But however various the phenomena that depend on this power, and may be explained by it, no mechanical principles can account for its effects; much less could it have produced, at the beginning, the regular situation of the orbs, and the present disposition of things. Gravity could not have determined the planets to move from well to call in orbits nearly circular, almost in the same plane; nor could this power have projected the comets with all the variety of their directions. If we suppose the matter of the system to be accumulated in the centre by its gravity, no mechanical principles, with the assistance of this power, could separate the huge and unwieldy masses into such parts as the sun and planets; and, after carrying them to their different distances, project them in their several directions, preserving still the equality of action and reaction, or the state of the centre of gravity of the system. Such an exquisite structure of things could only arise from the contrivance and powerful influences of an intelligent, free, and most potent agent. The same powers, therefore, which at present govern the material universe and conduct its various motions, are very different from those which were necessary to have produced it from nothing, or to have disposed it in the admirable form in which it now proceeds.

But we should far exceed the proper limits of this article, if, confining our observation to the earth, our own habitation was void of the principal traces of design and wisdom, as well as goodness, which are discernible in its figure and composition parts, in its annual and daily motion, in the position of its axis with regard to its orbit, in the benefit which it derives from the light and heat of the sun, and the alternate temperature of the seasons; in the atmosphere which surrounds it, and in the different species and varieties of vegetables and animals with which it is replenished. No one can survey the vegetable productions of the earth, so various, beautiful, and useful, nor the various gradations of animal life, in such a variety of species, all preferred distinct, and propagated by a settled law, each fitted to its own element, provided with proper food, and with instincts and organs suited to its rank and situation, and especially with the powers of sensation and self-motion, and all more immediately or remotely subservient to the government and use of man, without admiring the skill and wisdom of the original Creator. But these are more strikingly manifested in the structure of the human frame, and in the noble powers and capacities of the human mind; more especially in the moral principles and faculties, which are a distinguishing part of our constitution, and lead to the perception and acknowledgment of the existence and government of God. In those instances that have now been recited, and a variety of similar instances suggested by them, or naturally occurring to the notice of the curious and reflecting mind, contrivance is manifest, and immediately, without any nice or subtle reasonings, suggests a contriver. It strikes us like a sensation; and artful reasonings against it may puzzle us, without shaking our belief. No paragon, for example, that knows the principles of optics, and the structure of the eye, can believe that it was formed without skill in that science, and therefore, Sturmus held that the examination of the eye was a cure for atheism; and another excellent writer, cited below, observes, that if there were no example in the world of contrivance, except that of the eye, it would be alone sufficient to support the conclusion which we draw from it, as to the necessity of an intelligent creator; nor can it be supposed that the ear was formed without the knowledge of sounds; or that the male and female, created and preferred in due proportion, were not formed for each other, and for continuing the species. All our accounts of nature are full of instances of this kind. The admirable and beautiful structure of things for final causes excite our idea of the contriver; and the unity of design shews him to be one. The great motions in the system, performed with the same facility as the leaf, suggest his almighty power, which gave motion to the earth and the celestial bodies, with equal ease as to the minutest particles; the subtility of the motions and actions in the internal parts of bodies, shews that his influence penetrates the inmost recesses of things, and that he is equally active and present everywhere. The simplicity of the laws that prevail in the world, the excellent disposition of things, in order to obtain the best ends, and the beauty which adorns the works of nature, far superior to any thing in art, suggest his concomitant wisdom. The usefulness of the whole scheme, so well contrived for the intelligent beings who enjoy it, with the internal disposition and moral structure of those beings, shews his unbounded goodness. These are arguments which are sufficiently open to the views and capacities of the unlearned, while at the same
fame time they acquire new strength and lustre from the discoveries of the learned. The Deity's acting and interposing in the various ways in which he governs it as well as formed it; and the depth of his counsels, even in conducting the material universe, of which a great part furnishes our knowledge, tends to preserve an inward variegation and awe of this great being, and disposes us to receive what may be otherwise revealed to us concerning him. His essence, as well as that of all other substances, is beyond the reach of all our discoveries; but his attributes clearly appear in his admirable works. We know that the highest conceptions we are able to form of them are still beneath his real perfections; but his dominion over us, and our duty towards him, are manifest. See Mac Laurin's Account of Sir I. Newton's Phil. Difc. book iv. chap. q.

Those who wish to see the argument, which has been now stretched out in fome of its leading outlines, more fully illustrated and urged, may consult the works of Ray, Nieuwentyt, Baxter in his Matho, Derham, De la Planche in his Nature displayed, &c.; and more especially archdeacon Paley in his "Natural Theology, or Evidences of the Existence and attributes of the Deity, collected from the appearances of Nature." This admirable work, if our limits would allow it, would enable us very much to enrich this article.

One atheistic way, says this much approved and popular writer, of replying to our observations upon the works of Nature, and to the proofs of a Deity which we think that we perceive in them, is to tell us, that all which we see must necessarily have had some form, and that it might as well be in its present form as any. Let us now apply this answer to the eye.—"Something or other must have occupied that place in the animal's head; must have filled up, we will say, that focket; we will say also, that it must have been of that fort of fubstance, which we call animal fubfance, as flesh, bone, membrane, cartilage, &c.; but that it should have been an eye, knowing as we do what an eye comprehends, viz. that it should have confined, first, of a series of transparent leaves, (very different, by the bye, even in their fubstances from the opaque materials of which the rest of the body is, in general at least, composed; and with which the whole of its surface, this fingle portion of it excepted, is covered) secondly, of a black cloth or canvas (the only membrane of the body which is black) spread out behind these leaves, so as to receive the image formed by pencils of light transmitted through them; and placed at the precise geometrical distance at which, and at which alone, a distinct image could be formed, namely, at the concourse of the refracted rays; thirdly, of a large nerve communicating between this membrane and the brain; without which the action of light upon the membrane, however modified by the organ, would be loll to the purposes of fubfation. That this fortunate conformation of the parts first have been the hit, not of one individual out of many thousand individuals, like the great prize in a lottery, or like fome fanguity in nature, but the happy chance of a whole species; nor of one species out of many thousand species, with which we are acquainted; but of by far the greatest number of all that exift, and that under varieties, not cafual or capricious, but bearing marks of being fitted to their respective exigencies; that all this should have taken place, merely because fomething must have occupied these points in every animal's forehead; or that all this should be thought to be accounted for by the short answer, "that whatever was there must have had some form or other," is too absurd to be made more fo by any argumentation."—"Nor does it mend the answer to add, with respect to the fignality of the conformation, that, after the event, it is no longer to be computed what the chances were against it. This is always to be computed, when the question is, whether an useful or imitative conformation be the produce of chance or not. I defire no greater certainty in reafoning than that by which chance is excluded from the preient disposition of the natural world. Universal experience is against it. What does chance ever do for us? In the human body, for instance, chance, i.e., the operation of causes without design, may produce a wen, a wart, a mole, a pimple, but never an eye. Among inanimate fubstances, a clod, a pebble, a liquid drop, might be; but never was a watch, a telescope, or organized body of any kind, answering a valuable purpofe by a complicated mechanism, the effect of chance. In no affignable instance hath fuch a thing existed, without intention, somewhere. Some have faid "that the eye, the animal to which it belongs, every other animal, every plant, and every organized body which we fee, are only fo many out of the poible varieties and combinations of being, which the lapse of infinite ages has brought into exiftence; and that the preient world is the relic of that variety."—But "there is no foundation whatever for this conj-cture in any thing which we obferve in the works of nature: no fuch experiments are going on at prezent! No fuch energy operates as that which is here fup-posed, and which should be confidently putting into exiftence new varieties of beings; nor are there any appearances to support an opinion that every poible combination of vege-table or animal structure has formerly been tried." Should it be faid that the parts of animal bodies "were not intended for theufe, but that the ufe arose out of the parts; this difinition is intelligible."—But "there is little place for it in the works of nature. When roundly and generally affirm- ed of them, as it has fometimes been, it amounts to fuch an other fretch of affertion, as it would be to fay, that all the implements of the cabinet-maker's workshop, as well as his fhit-kin, were fubstances accidentally configured, which he had picked up and converted to his ufe; that his adzes, faws, planes, and gimlets, were not made, as we fuppofe, to new, cut, smooth, flape-out, or bore wood with; but, that thefe things being made, no matter with what defign, or whether with any, the cabinet-maker perceived that they were applicable to his purpofe, and turned them to account." If this kind of solution be applied to those parts of ani-mals, the action of which does not depend upon the will of the animal, it is fraught with still more evident absurdity. Is it poible to believe that the eye was formed without any regard to fivion, that it was the animal itself which found out, that though formed with no fuch intention, it would ferve to fee with; and that the ufe of the eye, as an organ of fight, refulted from this discovery, and the animal's application of it? The fame question may be asked of the ear: the fame of all the fenes, none of which depend upon the election of the animal; nor confequently upon his fagacity or experience. Others have choen to refer every thing to a principle of order in nature. A principle of order is the word; but what is meant by a principle of order, as different from an intelligent creator, has not been explained either by definition or example; and without fuch explanation, it should feem to be a mere fublimation of words for reasons, names for causes."—"Was a watch ever produced by a principle of order; and why might not a watch be fo produced as well as an eye?"—"The confidence," continues the author now cited, "which we place in our obseruations upon the works of nature, in the marks which we discover of contrivance, choice, and design, and in our reasoning upon the proofs afforded us, ought not to be shaken, as it is sometimes attempred to be done, by bringing forward to our view our own ignorance, or rather the general imperfection of
our knowledge of nature."—"True fortitude of understanding confides in not suffering what we know to be disturbed by what we do not know. If we perceive an useful end, and means adapted to that end, we perceive enough for our conclusion. If these things be clear, no matter what is obscure. The argument is finished."—"Our ignorance of many points need not suspend our assurance of a few."—"Contrivance," says our author, "if established, appears to me to prove every thing which we wish to prove. Amongst other things, it proves the personality of the Deity, as distinguished from what is sometimes called nature, sometimes called a principle: which terms in the mouths of those who use them philosophically, seem to be intended, to admit and express an efficacy, but to exclude and deny a personal agent. Now that which can contrive, which can design, must be a person. These capabilities constitute personality, for they imply conscious and thought. They require that which can perceive an end or purpose; as well as the power of providing means, and of directing them to their end. They require a centre, in which perfections unite, and from which volitions flow; which is mind. The acts of a mind prove the existence of a mind; and that, whatever it be, in which a mind resides, is a person.—"After all the struggles of a reluctant philosophy, the necessary refit is a deity. The marks of design are too strong to be got over. Design must have had a designer. The designer must have been a person. That person is God."—"But we must content ourselves with carnally recommending the works from which these detached extracts are made, to the perusal of our readers; for we cannot do justice to the author's admirable reasoning.

Another argument to prove the existence of God, as the creator and governor of the universe, may be deduced from the universal consent of mankind, and the uniform tradition of this belief through every nation and every age; it is impossible to conceive, that a fallacy so perpetual and universal, should be impaled on the united reason of mankind. No credible and satisfactory account can be given of this universal consent, without ascribing it to the original constitution of the human mind, in consequence of which it cannot fail to discern the existence of a deity, and to the undeniable traces of his being, which his works afford. Fear, flate-policy, and the prejudices of education, to which the concurrence of mankind in this principle has been sometimes resolved, are founded on this universal principle, suppose its being and influence, and are actuated by it. It is much more reasonable to imagine, that the belief of a God was antecedent to their operation, than that it should have been produced by them; and that it was dictated by reason and conscience, independent of the passions and policy of men. The uniform and universal tradition of this belief, and of the creation of the world by the divine power, affords concurrence evidence both of the principle and of the fact.

The existence of God is also farther evinced by those arguments which have been usually alleged to prove, that the world had a beginning, and therefore, that it must have been created by the energy of divine power. In proof of this, the history of Mole, considered merely as the most ancient historian, deserves particular regard. His testimony is confirmed by the most ancient writers among the heathens, both poets and historians. It may be also fairly alleged, that we have no history or tradition more ancient than that which agrees with the received opinion of the world's beginning, and of the manner in which it was produced; and that the most ancient histories were written long after that time.

And this consideration is urged by Lucretius, the famous Epicurean, as a strong presumption that the world had a beginning.

"... Si nulla fuit genitalis origo. Terra rum et caeli, temporaque interna fuere: Cur supra bellum Thba num, et funera Troje, Non alas ad quoque res exscrece poetae?"

Besides, the origina and progress of learning, and the most useful arts, confirm the notion of the world's beginning, and of the common era of its creation; to which also may be added, that the world itself, being material and corruptible, must have had a beginning; and many phenomena occur to the observation of the astronomer and natural historian, which furnish a strong presumption that it could have had no long duration, and that it gradually tends to dissolution. From all these considerations we may infer the existence, attributes, and providence of God. If we admit miracles, as facts authenticated by credible history, those, considered as deviations from the established course of nature, afford independent evidence of the being of God. See MIRACLE.

God is also used in speaking of the false deities of the heathens, many of which were only creatures to which divine honours and worship were superstitiously paid.

The Greeks and Latins, it is observable, did not mean, by the name God, an all-perfect being, whereof eternity, infinity, omnipotence, &c. were essential attributes; with them, the word only implied an excellent and superior nature; and, accordingly, they give the appellation gods to all beings of a rank, or class, higher and more perfect than that of men; and especially to those who were inferior agents in the divine administration, all subject to the one supreme.

Thus men themselves, according to their fysm, might become gods, after death; insomuch as their souls might attain to a degree of excellency superior to what they were capable of in life.

The first divines, father Boffin obsevrs, were the poets: the two functions, though now separated, were originally combined; or, rather, were one and the same thing. Now the great variety of attributes in God, that is, the number of relations, capacities, and circumstances, wherein they had occasion to consider him, put the% poets, &c. under a necessity of making a partition, and of separating the divine attributes into several persons: because the weaknesses of the human mind could not conceive too much power and action in the simplicity of one single divine nature. Thus the omnipotence of God came to be represented under the person and appellation of Jupiter; the wisdom of God under that of Minerva; the justice of God under that of Jutnos. The first idols, or false gods, that are said to have been adored, were the stars, sun, moon, &c. on account of the light, heat, and other benefits which we derive from them. (See Idolatry.) Afterwards the earth came to be deified, for furnishing fruits necessary for the subsistence of men and animals; then fire and water became objects of divine worship, for their usefulness to human life. In process of time, and by degrees, gods became multiplied to infinity; and there was scarce any thing but the weaknesses, or caprice of
fome devotee or other, elevated into the rank of deity; things
usefes, or even destrucfive not excepted.
The principal of the ancient gods, whom the Romans
called divi majorum genifum, and which Cicero calls celefial
gods, Varro felix deos, Ovid nobles deos, others confentcs deos,
were Jupiter, Juno, Vefla, Minerva, Ceres, Diana, Venus,
Mars, Mercury, Neptune, Vulcan, and Apollo. Jupiter
is confidered as the god of heaven; Neptune as god of the
sea; Mars as the god of war; Apollo of eloquence, poe-
dery, and phyfic; Mercury of thieves, Bacchus of wine, Cupid
of love, &c.
A fecond fort of gods, called demi-gods, demi-divi, divi
minorum genifum, indiigeis, that gods adopted, were men cano-
nized and deified. As the greater gods had possession of heaven
by their own right; these fecondary deities had it by right
and donation; being translated into heaven because they
had lived as gods upon earth.
The heathen gods may all be reduced to the following
classes:
1. Created spirits, angels, or daemons: whence good and
evil gods; Genii, Larces, Lemures, Typhones, guardian
gods, infernal gods, &c.
2. Heavenly bodies: as the sun, moon, and other planets:
alfo the fixed fars, confullations, &c.
3. Elements; as air, earth, ocean, Opis, Vefla; the ri-
vers, fountains, &c.
4. Meteors. Thus the Perifians adored the wind: thun-
der and lightning were honoured under the name of Gery-
on; and feveral nations of India and America have made
themselves gods of the fame. Cadhor, Polux, Helena, and
Iris, have alfo been preferred from meteors to be gods; and
the like has been praculfed in regard to comets: witnefs that
which appeared at the murder of Cefar. Socrates defied
the clouds, if we may give credit to Ariophanes; and the pri-
mitive Chriflians, Tertullian affures us, were reproached
with the fame thing.
5. They erected minerals, or foifs, into deities. Such was
the Batxylus; the Finlanders adored fonnes; the Scythians
iron; and many nations fiver and gold.
6. Plants have been made gods. Thus leeks and onions
were deities in Egypt; the Scavi, Lithuanians, Celts,
Vandals, and Peruvians, adored trees and forests; the ancient
Gauls, Britons, and Druids, paid a particular devotion to the
oak; and it was no other than wheat, corn, feed, &c.
that the ancients adored under the names of Ceres and Pro-
ferpine.
8. They took themselves gods from among the waters.
The Syrians and Egyptians adored fihes; and the Tri-
tons, Nereids, Syrens, &c. what were they but fihes? Se-
veral nations have adored ferpents; particularly the Egyp-
tians, Poffrians, Lithuanians, Samogitiens, &c.
8. Infedes, as flies and ants, had their priafe and votaries;
these among the Theliffians, and thofe in Acrania, where
bullocks were ofered to them.
9. Among birds, the flork, raven, the sparrowhawk, ibis,
eagle, giffon, and lapwing, have had divine honors; the laf
in Mexico, the reil in Egypt, and at Thibes.
10. Four-footed beafts have had their altars; as the bull,
dog, cat, wolf, baboon, lion, and crocodile, in Egypt, and
eelfewhere; the hog in the ifland of Crete; rats and mice in the
Troas, and at Tenedos; weafels at Thibes, and the
porcupine throughout all Zororaller's fchool.
11. Nothing was more common than to place men among
the number of deities; and from Belus or Baal, to the Roman
emperors before Constantine, the infinaces of this kind are
univerfable: frequently they did not wait fo long as their
death for the apothefis. Nebuchadnezzar procured his flature
to be worfhipped while living; and Virgil faws that Augus-
tus had altars and sacrifices offered to him, Eclog. i. 6, 7
As we learn, from other hands, that he had priafes called
Augufidae; and temples at Lyons, Narbona, and feveral
other places; and he muft be allowed the firit of the Romans,
in whole behalf idolatry was carried to fhuch a pitch. The
Ethiopians deemed all their kings gods: the Velleda of the
Germans; the Janus of the Hungarians; and the Thaut,
Woden, and Afta, of the northern nations, were, indifpu-
tably, men.
5. Not men only, but every thing that relates to man,
has alfo been defieued: as labour, ref, sleep, youth, age, death,
virtues, vives, occafion, time, place, numbers, among the
Pythagoreans; the generative power, under the name of
Pranpas. Infancy, alone, had a cloud of deities; as Vage-
tanus, Levana, Rumina, Edusa, Potina, Cuba, Cuminia,
Carna, Offiago, Statuhius, Fabulifus, &c.
They alfo adored the gods health, fever, fear, love, pain,
indignation, fame, impudence, opinion, renown, prudence,
ience, art, fidelity, felicity, calumni, liberty, money, war,
peace, victory, triumph, &c.
Lastly, nature, the universe, or re, was reputed
a great god.
Hevob has a poem under the title of Deprons, i.e. the ge-
neration of the gods; wherein he explains their genealogy and
defecf; fets forth who was the firft, and principal; who
next defcended from him, and what ifue each had; the whole
making a fort of fyllem of heathen theology.
Beside this popular theology, each philofophcr had his
fsylum: as may be feen from the Timax of Plato, and Cic-
ere De Natura Deorum.
A6us Martyr, Tertullian in his Apologetics, and in his
book Contra Genes; Arnobius, Miniatius Felix, La<ntius,
Eufebius, Prepar & Demonfl. Evangel. St. Augustine De
Civit. Dei, and Theodoret Adverf. Gentes, show the vanity
of the heathen gods.
It is very difficult to difcover the real sentiments of the
heathen with refpect to their gods: they are exceedingly
itriate and confused, and even frequently contradictory.
They admitted fo many superior and inferior gods, who shared
the empire, that all was full of gods. Varro reckons up no lefs
than 30,000 adored within a small extent of ground, and yet
their number was every day growing. The way to hea-
ten was fo easy for the great men of those days, that Ju-
enum in his Bifem explaining he was ready to fink under the
load of fuch a number of new gods as were daily placed in
the heavens; yet father Murgeres feems to have proved that
all the philofophers of antiquity have acknowledged that
there was but one God. Plan. Theol. de Sect. Scavans de
la Grecie.
God, All of. See Disability.
God, Peace of. See Peace.
God, Son of. See Son.
God, Truce of. See Truce.
God, Worship of. See Worship.
GODAGARY, in Geography, a town of Bengal; 18
miles N. of Moorheadabad.
GODALMING, a market town and parish in the
county of Surry, England, contains 474 houses and 3405
inhabitants. The town is built in a valley, on the banks of the
river Wey, which is divided into feveral small freams
here. The chief of this is navigable to Weybridge, where
it unites its waters with the Thames. In the vicinity of the
town are fome corn-mills, and paper-mills. Here are feveral
fab mechanies for weaving flockings, patent feecy fofetry,
and coarse woollen cloths; woof-combing and fpinning of
worfled alfo contribute part of the trade of the place. The
parish
Godama, Godama, Godama, Gotama, or Gautom, in Indian Mythology, different names applied in various parts of India, and particularly in the Burman empire, to their deity Buddha, or Booudh. (See Booodh.) Godama or Godama is the most common appellation among his worshippers in India beyond the Ganges; it seems also to be common among the Hindoos, who, according to the idiom of the Sanscrit, write it Gotamas. This name, as some say, literally signifies cow-herd, but metaphorically king; and, according to others, the meaning of Godama is eminently wise, or a sage. Many other appellations are given to this deity derived from the poisons in which his various images represent him. Godama was probably an Indian prince, deified by superstitiion; and in an ancient treatise, giving an account of the religion of Godama, entitled "Zaradu," Godama is said to have attained divinity at the age of 35 years, to have preached his law for 45 years, and to have brought salvation to all living beings. Dr. Buchanam, who cites this treatise (Af. Ref. vol. vi.) places the death of Godama 546 years B. C. The doctrine and laws, said in this treatise to be delivered by Godama, confid chiefly in observing the five commandments, and in abstaining from the ten sins. The five commandments are as follow: 1. From the meanest infect up to man, thou shalt kill no animal whatever. 2. Thou shalt not steal. 3. Thou shalt not violate the wife or concubine of another. 4. Thou shalt tell nothing false. 5. Thou shalt drink neither wine, nor any thing that will intoxicate; thou shalt not eat opium, or any other intoxicating drug. The person who keeps these five commandments shall attain high rank, and shall not be liable to poverty, nor to other misfortunes and calamities. The ten sins are the killing of animals—thief—adultery—falsehood—discontent—harsh and indignant language—idle and superfluous talk—the coveting of your neighbour's goods—envy, and the desire of your neighbour's death, or misfortune—and the following of the doctrine of false gods. Every one who abstains from these sins, will successively increase in virtue through all his successive transmigrations, till at length he will become worthy of beholding a God, and of hearing his great voice; and he will be exempted from the four human miseries, viz. weight, old age, disease, and death. The good works required are giving alms, and thoughtfully pronouncing three words. Whoever dies without the abstinence and good works here prescribed, will certainly pass into one of the infernal states, and be doomed to certain transmigrations. The precepts of Godama are called Rahans in the Burman language, and they have also bestowed upon them the title of Somoua or Samana, which is likewise applied to the images of the divinity when he is represented, as he commonly is, in the priestly habit. (See Rahans.) Godama commanded his images and relics to be worshipped. The largel and most celebrated temples in generally in the form of a pyramid; and contain some of these relics, such as a tooth, a bone, a hair, or a garment. To these temples the prayers of the devout are addressed, and their offerings presented. The images of the god are of various materials—clay, copper, silver, and alabaster. Many of them are richly gilt, and adorned with paintings of flowers; they are of different sizes, some being not above six inches high, and others of a colossal stature. Other objects of great veneration among the worshippers of Godama are stones of large dimensions, carved with various hieroglyphics, and said to represent, or to be the impressions of his feet. The principal disciples of Godama are by his followers considered as sages; and many images of these, in a priestly habit, accompany that of their master. Every true worshipper of Godama prays before he goes to sleep, and before he rises in the morning, which is generally at the dawn of day.

Besides their private devotions, which are numerous and regularly performed, it is customary to make offerings at the temple; the sacrifices for which are those of the four phases of the moon, especially the full and change, which may be considered as the Burana fables. Friday is with them reckoned an unfortunate day, and therefore on this day they undertake no business; but they keep holy no particular day of the week. The fact of Godama declare the opinion of a divine being, who created the universe, to be highly impious; and accordingly the followers of Godama are, fiercely speaking, atheists, as they suppose every thing to arise from fate; and their gods are merely men, who by their virtue acquire supreme happiness, and by their wisdom become entitled to impose a law on all living beings. See Burman Empire, and Booodh.

Godana, in Geography, a town of Persia, in the province of Trak; 105 miles E. of Ipahan.

Goadery, or Gonga Gondwy, a river of Hindostan, sometimes called the Gang in Ferihil's History, was, till very lately, considered as the same with the Cattack river, or Mahanuddy; but it is now ascertained to be a different river, which has its source about 70 miles N.E. of Bombay; and the western Gouts, more properly called the Sukhin mountains; and, in the upper part of its course, at least, is effemed a sacred river by the Hindoos; that is, ablutions performed in its stream have a religious efficacy superior to those performed in ordinary streams. The Godavery, after traversing the Dowatabad lounah, and the country of Tellagama, from west to east, turns to the south-east; and receiving the Bain Gunga, about 90 miles above the sea, besides many smaller rivers, separates into two principal channels at Rajamundry; and thence subdividing again, they form altogether several tide harbours, for vessels of moderate burden. Ingrum, Coringa, Yaram, Bandarma-lanka, and Narsapour, are among the places situated at the mouth of this river; which appears to be the most considerable one between the Ganges and Cape Comorin. Extensive forests of teak-trees border on its banks, within the mountains, and supply flint-timber for the use of the ports above-mentioned. The Killnala and Godavery rivers, however remote at their fountains, approach within 80 miles of each other in the lower parts of their course; and form an extensive tracts of country, composed of rich vegetable mould, such as is usually found at the mouths of large rivers. Renell. See Delta.

God, in our Ancient Saxon Cofram, an ecclesiastical or church fire, for crimes and offences committed against
against God. These, according to Blacklone, are opulency and liberty, which see.

GODDARD, Jonathan, in Biography, an eminent physician and chemist, was born at Greenwich in the year 1617. After studying for four years at Oxford, he set out on his travels, and on his return he settled in practice in London, having taken his degree at Cambridge. He was elected a fellow of the College of Physicians in 1645, and in 1647 was appointed lecturer on anatomy. In conjunction with some friends, he formed a society for experimental inquiry, which met at his lodgings in Wood-street, and in promoting the objects of which he was extremely assiduous. Having gained considerable reputation, and having, with the rest of his party, sided with parliament, he was appointed by Cromwell chief physician to the army, and in this capacity accompanied the usurper to Ireland in 1649, to Scotland in the following year, and thence returned with his master, who, after the battle of Worcester, rode into London in triumph, September 12th, 1651. He obtained many favours from Cromwell, who first made him warden of Merton college, Oxford, afterwards feke representative of that university in the Short Parliament in 1653; and in the same year one of the council of flate. These favours were sufficient to procure for him the displeasure of Charles II.; and, being driven from Oxford, he removed to Gresham college, where he had been chosen professor of physic in November 1655. Here he continued to frequent those meetings, which gave birth to the Royal Society, and was nominated one of the first council of that institution in the charter. Dr. Goddard was a conscientious and able practitioner. Partly from the love of experimental chemistry, principally from a distrust in the knowledge of apothecaries, he prepared his own medicines, and recommended the practice to be adopted by physicians in general. Finding numerous obstacles, however, in his way, he published "A Difcourse, letting forth the unhappy condition of the practice of physic in London," 1669. But this was of no avail. He died on the 24th of March, 1674, being seized with an apoplectic fit in Cheap-side, when returning from one of the philosophic meetings. Two papers of his was published in the Philosophical Transactions, No. 137, 159; and many others in Birch's History of the Royal Society.

GODDESS, Dea, Diva, a heathen deity, to whom they attributed the female sex.

The ancients had almost as many goddesses as gods. Such were Juno, the goddess of air; Diana, the goddess of woods and chastity; Proserpina, the goddess of hell; Venus, of beauty; Thetis, of the sea; such also were Victory, Fortune, &c.

Nay they were not contented to make women gods, and admit both sexes into the roll; but they had also hermaphrodite gods Thus Minerva, according to several of the learned, was both man and woman, and worshipped both under the appellation of Lunus and Luna. Mithras, the Persian deity, was both god and goddess, and the fexes of Venus and Vulcan are very dubious: whence, in the invocations of those deities, they used this formula; "Be thou god or goddess," as we learn from A. Gallus. It was a privilege peculiar to goddesses, that they might be represented on medals, naked. The imagination, it was supposed, must be axed, and kept from taking liberties, by the consideration of the divine character.

GODEAU, Anthony, in Biography, was born at the city of Druye in the year 1615. He was educated for civil and active life, but having met with a disappointment in the object of his affections, he repaired to Paris, where he cultivated the society of men of letters, and was one of the first of those who established the French academy of belles lettres. This society suggested to the cardinal Richelieu the foundation of the French academy, of which M. Godeau was an original member. He took orders in the year 1735, and having enriched his own mind with the most perfect maxims of Christian morality, he taught them from the pulpit with much eloquence, and he is said to have practised them in all his actions. In the year 1636 he was, by the influence of cardinal Richelieu, nominated to the bishopric of Grafe, and from this time he divided his time between his studies, and the diligent discharge of his episcopal functions. He found the state of ecclesiatical discipline exceedingly relaxed, and set about its reformation; he personally examined the qualifications of the clergy, and enquired in what manner they discharged the important duties of their office; he frequently preached in different parts of his diocese, and exhibited in his own life an admirable model of those virtues which he was anxious to recommend to the attention of his flock. He was in high favour with pope Innocent X. who granted him bulls of union of the bishopric of Venice with that of Grafe, but when he found that the people and clergy opposed the measure, he chose rather to give up his pretensions, than break in upon the peace of the church. He died in 1672, at the age of sixty-seven years. He was a considerate writer, chiefly on subjects connected with his profession, but his most important work was "The History of the Church from the commencement of the World to the end of the Ninth Century," in three volumes, folio. This is the first ecclesiastical history written in the French language; and though composed with less precision than that of the abbé Fleury, it possesses considerable merit. It is characterized by Dupin as "exact, faithful, and agreeable;" he farther adds, that it always will have a merit, which neither time, nor any other history will be able to efface. Besides the history, we may notice M. Godeau's "Paraphrases on the Epistles of St. Paul;" "The New Testament translated and explained;" "The Lives of St. Paul, St. Augustine, and St. Charles Borromeo, &c." Moreni.

GODEFROI, Denis, a very learned jurist, was born at Paris in 1549. He studied at Louvain, Cologne, and Heidelberg, and upon his return to France acquired a high reputation in the parliament, in which he was nominated to a councillor's place. In 1580 his religious principles obliged him to seek a refuge at Geneva, where he was admitted a burgker, and a professor of the law. In 1585 Henry IV. created him bailiff of some villages at the foot of mount Jura, and a supernumerary counsellor in the parliament of Paris. After this he was deprived of his employment and his valuable library by the invasion of the duke of Savoy, and in 1594 he accepted the professorship of the law in the university of Stralburg. In 1603, at the invitation of Frederick, elector-palatine, he went to settle at Heidelberg, and in 1618 that prince sent him on an embassy to Lewis XIII., who received him with marks of high esteem. He died at Stralburg in 1622, leaving behind him many works that testify to his great learning. The titles of these are enumerated by Moreni and others, and a few of the principal may be mentioned here: "Corpus Juris civilis cum notis;" this treatise has been frequently reprinted; the second edition is said to be that from the Elzevir press in two volumes folio. "Note in IV. Libros Institutionum;" "Praxis Civilis ex antiquis et recentioribus Scripturis;" "GODEFROI, Theodore, the eldest son of the preceding, was born at Geneva in 1580. He pursued his studies first
in that city, then at Strasbourg, and afterwards at Paris, where he embraced the Catholic religion. In 1643 he obtained the office of counsellor of state, and acted during the six last years of his life as counsellor and secretary to the French embassy for the general peace at Munster. Here he died in 1649. He was particularly vered in the genealogical and ceremonial history of France, and published several learned works for its illustration; such are "Le Ceremonial de France," 10, "Memoirs concerning the Prefidence des Rois de France sur les Rois d'Espagne;" "De la veritable Origine de la Maifon d'Autriche;" "Traité touchant les Droits du Roi Tres-chrétien sur plusieurs États vofînes," &c. Moreri.

GODEFROY, James, brother to Theodore, was born at Geneva in 1587. He followed the steps of his father by a strict adherence to the reformed religion, and by pursuing the studies of law, history, and philosophy. In 1619 he was created professor of the law at Geneva, and was called to a seat in the council in 1629. He filled with the greatest zeal and ability every public office with which he was entrusted. He was five times elected syndic of the republic, and was made secretary of state. He was chosen as a fit person to conduct various negotiations in France, Piedmont, Switzerland, and Germany; and, at the same period, he devoted all his leisure to public lectures in jurisprudence, and composed a variety of learned works. He maintained a correspondence with the most learned men of the age, by whom he was greatly respected. He died in 1652, and his works bear testimony to his profound erudition, and to his great and unwearied industry; among them may be mentioned "Fragmenta Duodecim Tabularum;" "Anamivalvations Juris Civilis;" "De Jure Præcedentibus;" "Codex Theodisciussianus," a pothumous work, regarded as a most valuable monument of ancient jurisprudence. He edited the works of Cicero, "cum notis Lambini et Gothofredi." He had likewise made large collections for the history of Geneva, which were afterwards used by Spon. Moreri.

GODEFROY, Denis, son of Theodore, born at Paris in 1615, was an able French historian. He was author of "Memoires et Instructions pour servir dans les Negotiations et les Affaires concernant les Droits du Roi," a work, which has sometimes been attributed to the chancellor Seguier, by whose order it was compiled. He re-edited the works of his father's works, adding to them new illustrations with learned notes. He continued to his own time Feron's "Hill. des Officiers de la Couronne." As a public man he was appointed in 1668 the director and keeper of the chamber of accounts at Lille in Flanders, where he died in 1681. Moreri.

GODEFROY, John, son of the preceding, succeeded his father in the direction of the chamber of accounts at Lille, where he died, much advanced in years, in 1732. He published an edition of the "Memoirs of Philip de Comines," in five volumes 8vo. "The Journal of Henry III." "The Memoirs of Queen Margaret." He is said to have contributed more than any other writer to the elucidation of the affairs of the League. Moreri.

GODERVILLE, in Geography, a town of France, in the department of the Lower Seine, and chief place of a canton, in the district of La Havre; 9 miles N.E. of Montville. The place contains 650, and the canton 15,339 inhabitants, on a territory of 150 kilometres, in 31 communes.

GODESCHALC, in Biography, a Benedictine monk, who flourished in the ninth century, was born in Saxony, and was brought up, contrary to his own inclination, to the profession, in the convent of Fulda. He was ordained priest when he was about forty years of age, and in 846 we find him at Rome visiting the holy places there; thence he proceeded to Pannonia and Dalmatia, where he commenced preaching the doctrine of predestination with much fervour, which it is supposed he imbided from the works of St. Augustine. Upon his return to his own country he had a conference with Nottingus, bishop of Verona, before whom he maintained that God, from all eternity, had pre-ordained some to everlasting life, others to everlasting punishment and misery. Nothingus, astonished and terrified at so daring a doctrine, as, he thought, impious a position, complained of it to Rabanus, archbishop of Mentz, who undertook to confute his error, in writing. Displeased, perhaps, with his own arguments, Rabanus summoned a council to meet at Mentz, in the year 848, to which, however, Godeschalc preferred a justification of his opinions, and resolutely perfilled in maintaining them to be consistent with the scriptures and the fentence of the orthodox fathers. The council passed sentence of condemnation upon him, and sent him prisoner to Hincmar, archbishop of Rheims, within whose jurisdiction he had received the priesthood. Hincmar, who was devoted to the interest of Rabanus, assembled a council in 849, in which he was a second time condemned, and rendered liable to a punishment repugnant to all the principles of religion and humanity. Godeschalc, however erroneous his sentiments might be, was not to be intimidated; he believed what he asserted, and he firmly adhered to the doctrine in spite of the higher powers. Hincmar accordingly proceeded to put the sentence into execution, degraded the monk from the priesthood, and ordered him to be scourged with the utmost severity. It appears that he was not prepared for so grievous a trial of his fortitude; the force of the pains inflicted on him obliged him, in compliance with the dictates of his persecutors, to throw into the fire the justification of his opinions which he had delivered into the council. The infamous persecutors were not contented with this triumph; they committed him close prisoner to the monastery of Hautvilliers, in the diocese of Rheims. In this, as in every other case of a similar kind, the sufferings of Godeschalc gained him followers and adherents, and many became advocates for his cause. A considerable schism was produced in the Latin church. Some confined themselves to the defence of his person and conduct, while others employed all their zeal and talents in the vindication of his doctrine. The spirit of the controversy ran so high between the contending parties, that Charles the Bald, in 853, summoned the council to meet at Quercy. Here the suffering monk was again condemned, but the decrees of this council were declared null and void, and Godeschalc and his doctrine vindicated and defended, in a council at Valence, in Dauphiny, in 855, the decrees of which were confirmed in the council of Langres, and in that of Touff. Such was the origin of the disputes concerning the doctrines of predestination and grace, which, from time to time, have divided the Catholic world into two parties, and which have fubscribed in full force among the Protestants. The unfortunate Godeschalc died in prison about the year 856, maintaining with his last breath the doctrine for which he had suffered. The only writings of this monk that have come down to the present times are, two "Confessions of Faith," inserted in archbishop Uther's "Historia Godeschalcii," printed at Dublin in 1641; an epitite to Ratramus, published in Cellot's "Historia Godeschalcii," at Paris, in 1635, and some fragments of other pieces, noticed by Cave. Godeschalc has immortalized his name by setting on foot the controversy
controversy to which we have referred, and by his sufferings in vindication of his favourite doctrine. In the year 1650, the celebrated Maguin published at Paris, in two volumes 4to, a collection of the early treatises produced on both sides of this controversy, entitled "Veterum Auctorum qui sive seculari de Praeludiationibus et Gratia scripturum, &c." "GOD-FA'ATHERS, and GOD-MOTHERS, persons who direct and attend at the baptism of infants, or other persons; who give the name, and who become sureties for the faith and good conduct of the infant baptized. Hence they are called confessors, or more commonly sponsors. To this purpose Dr. Nichols, (Def. part ii. p. 273.) says, that "the sureties in baptism religiously engage for the faith of the baptized; that they shall sincerely believe all that is revealed in the gospel, and shall direct the subsequent actions of their lives by the laws of Christ." Against this practice Protestant dissenters have alleged, that the parents, to whom both God and nature have committed the education of their child, are the proper persons to stand forth at its baptism, and take upon them this great and important trust; and to bind themselves by a solemn vow faithfully to discharge it. They object to the order and practice of the established church, that without sufficient authority from reason, or scripture, or the ancient practice of the Christian church, parents are set aside in this solemnity, and forbidden to stand forth, and take upon them this great charge to which God hath called them. For the 29th canon expressly commands, "that no parent shall be urged to be present at his child's baptism, nor be admitted to answer as god-father for his own child." They also object, that the forms of the church should require other persons to appear instead of the parents, and to take upon them this important trust, and most solemnly to promise before God and the church the performance of that, which few of them ever do, or perhaps ever intended to perform, or are capable of performing. It has been pleaded, and even generally allowed, that sponsors in baptism were not known or thought of in the primitive apostolic church. Tertullian, who lived about A.D. 200, seems to have been the first of all Christian writers who mentions persons of this description: "What necessity is there," says he, (De Baptism.) "that sponsors should expose themselves to danger, who, through death, may fail of the performance of their promises, or may be deceived by the wicked dispositions of those for whom they promise." "Whether the use of sponsors was from the apostles' days," (says lord King, in his Enquiry into the Constitution, &c. of the Primitive Church,) "I cannot determine, unless the negative may be conjectured from Justin Martyr, Tertullian's successor by 50 years, who, when he enumerates the method and form of baptism, says not one word of sponsors or god-fathers, as may be seen in his second apologue, p. 93, 94.) St. Austin, one of the earliest of Christian writers who mention sponsors, who lived about A.D. 350, informs us when, and upon what occasion, these sponsors were admitted: "A great many," says he, "are offered to baptism, not by their parents, but by others, as infant-slayers are sometimes offered by their masters; and sometimes when the parents are dead, the infants are baptized, being offered by any who can afford to shew this compassion to them. And sometimes infants, whom their parents have cruelly exposed, to be brought up by those who light on them, are now and then taken up by the holy church, and offered to baptism by them who have no children of their own, nor design to have any." Upon these words of Austin, Dr. Wall ingeniously confecs, (Hist. Inf. Bapt. vol. i.) "Here we see the ordinary use there was for parents to answer for the children; but yet that this was not counted so necessary, as that a child could not be baptized without it." Hence it has been inferred, that parents were never set aside, when they were capable and willing to offer their children; and that only in cases of the incapacity of parents, were sponsors admitted; and in all such cases, provided the practice be not enforced as a Christian institution, and as absolutely indispenfable, the dissenters, we conceive, could not reasonably object to it. Mr. W. S. a well-known writer on the Common Prayer, observes, that the god-fathers and god-mothers of persons baptized at riper years "are only appointed as assistants of the engagement, and undertake no more than to remind them hereafter of the vow and profession, which they made in their presence." And yet our church estátedin expressly affirms, and repeats the attention, that the sponsors, engaging for infants, engage that they shall believe and repent; for the infants are said to promise both these things by their sureties. Free and Candid Disquisitions, p. 131.

The number of god-fathers and god-mothers is now reduced to three in the church of England, and two in that of Rome: anciently, they had as many as they pleased.

The Romanists have also god-fathers and god-mothers at their confirmation. They even give god-fathers, &c. to children, at their baptism.

Among the ancients it was the custom for persons of quality to have others of like quality cut their children's hair the first time; by which they became reputed a sort of god-fathers; and the like was practiced with regard to the hair of the beard.

God-Father was also a name anciently given to a kind of feods, who attended and assisted the knights in tournaments, or single combats.

The god-fathers of deeds were a kind of advocates, who were chosen by the two parties to represent the reasons of their combat to the judges.

Something of this kind was long retained at solemn carousals. There were two or more in each quadrill. See Quadrill.

The institution of god-fathers and god-mothers, patrini and matrim, is originally Roman. They are said to have been people who, in the games of the Circus, attended the chariots, shows, and images, of the gods. Cicero makes mention of them, in his oration De Haruspicis Reponis. Their office was much like that of the children in some Romish ceremonies, who are drest in the habit of angels, to throw flowers, bear incense-pots, lights, &c. and accompany the relics and images of saints.

Godfrey of Bouillon, in Biography, celebrated for the part which he took in the first crusade, and king of Jerusalem, was the son of Eulace II., count of Boulogne. The appellation of Bouillon was derived from his lordship of that name in the Ardennes. In his youth he served in the armies of Henry IV., who, as a reward of his valor and fidelity, conferred upon him the title of duke of Lorrain. When the religious enthusiasm of the times set on foot an expedition for the recovery of the Holy Land from the possession of the Saracens, Godfrey was one of the earliest and most illustrious of the princes who took the cross. The command of the principal army was entrusted to his care, and it is agreed that none among the leaders were actuated by purer motives than Godfrey. He gave a distinguishing proof of the diklalere of conduct, by sacrficing almost all his property to defray the necessary expenses of the expedition. Godfrey set out in the autumn of 1096, and proceeded with his host through Germany and
and Bulgaria, taking care to abstain from those acts of hostility and rapine which characterized, and had caused the destruction of the fanatics of Peter the Hermit. It was not till June 1559, that Godfrey was able to lay siege to the renowned city, and though his army was greatly diminished in point of numbers, he was able to succeed, and on July 15th Jerusalem was taken by storm. The fanaticism and madness of the victors indulged themselves in a horrible massacre of the vanquished, which, it is believed, their general and leader was unable to prevent. Godfrey was almost immediately proclaimed sovereign of the new acquisition, but he refused to assume the title and emblems of royalty in the place where Christ, in whose cause he was acting, had been crowned with thorns, and he governed under the modest appellation of "Defender and Baron of the Holy Sepulchre." He was soon after attacked by the sultan of Egypt, but the Christians soon put him and his numerous forces to flight, and the whole of Palestine was reduced under the power of Godfrey. He established the feudal institution in his kingdom, and a code of jurisprudence, under the title of "The Adaiz of Jerusalem," gave a model of the purest form of European liberty in the midst of Asiatic despotism. He died, after he had sat on the throne about a year, and was succeeded by his brother Baldwin. The celebrity of Godfrey is immortalized as the hero of Tasso's "Jerusalem Delivered," one of the noblest of epic poems; nor has the bard found it necessary to borrow the colours of fiction, in order to throw splendour round a character so truly estimable: "Godfrey," says the historian in describing his character, "was the first who ascended the walls of Rome, and his flicks, his vow, perhaps his remorse for bearing arms against the pope, confirmed an early resolution of visiting the holy sepulchre, not as a pilgrim, but as a deliverer. His valor was matured by prudence and moderation; his piety, though blind, was sincere, and in the tumult of a camp he practiced the real and fictitious virtues of a convent. Superior to the private factions of the chiefs, he referred his enmity for the enemies of Christ; and when he gained a kingdom by the attempt, his pure and disinterested zeal was acknowledged by his rivals." Gibbon Univer. Hill. See also the article CROSAD.

GODFREY of Viterbo, an Italian historian of the 12th century, was chaplain and secretary to the emperors Conrad III., Frederick I., and Henry IV. According to his own account he was a great traveller for knowledge; and was conversant in several languages. His principal work was a "Chronicle," entitled the "Pantheon," as treating on the "Gods of Earth," is dedicated to pope Urban III., and is a general historical record from the creation of the world to the year 1186. It is written in the Latin language, and is deemed very worthy of credit for the events of its own time. It was first printed at Basil in 1559; then at Frankfort in 1584, and afterwards at Hanover in 1613, in the collection of German historians, edited by Pilgrim. Godfrey was author of a work intitled "Speculum Regum, sive de Genealogia omnium Regum;" the MS. is preserved in the Imperial library of Vienna.

GOD-GILD, in our Ancient Cof lanes, that which is offered to God, or for his service.

GODHEAH, or Good Hope, in Geography, a settlement in West Greenland. N. lat. 64° 35'. W. long. 58° 13'.

GODIN, Louis, in Biography, was born at Paris in 1704. He studied astronomy under de Piles, and in 1725 was made adjunct of the Academy of Sciences. To him was entrusted the care of editing its memoirs, and under his direction the first eleven volumes were published. In 1735 he was sent, with other members of the academy, to measure a degree of the meridian at Peru. He was some time professor of mathematics at Lima, and on his return in 1751, he was appointed a colonel in the Spanish service, and director of the naval academy at Cadiz, where he died in the year 1760. He was author of several astronomical papers in the memoirs of the academy from 1725 to 1739; and he published "Machines et Inventions approvées par l'Académie des Sciences," in 6 vols. 4to. "Connaissance des Temps," which he conducted five years. "Cours des Mathematiques," 1756. Gen. Biog.

GODING, or Hopöning, in Geography, a town of Moravia, in the circle of Brunn; 16 miles E.S.E. of Aufpesz.

GODO, a town of Arabia, on the coast of the Persian gulf; 140 miles W. of Julfar.

GODOUA, a small town of Fezzan; 50 miles N. of Mourzouk, and about the same distance from Sebba, which see.

GODRA, a town of Hindoooolam, and capital of a circar of the same name in Guzerat; 55 miles E. of Amedabad. N. lat. 22° 50'. E. long. 73° 40'.

GOD'S HOUSE, League of, a territory of Switzerland, formerly under the dominion of the bishop of Coire, until the people, oppressed by their rulers, threw off the yoke, and, forming a general league, compelled the bishop to ratify their independence. The revolution, which finally exalted this league into its present state of freedom, probably took place between 1424, the era of the formation of the Grey league, and 1436, the year in which the ten jurisdictions rose into independence. This league is denominated in Romanc, "La Légia de la Chiada," in German "Gottshaußbach," whence is derived the appellation of the "League of the house of God," which it takes from the cathedral situated in its capital, as well as because it was once under the jurisdiction of the bishop of Coire. This league is divided into eleven districts, each of which (Coire excepted) is subdivided into two little republics, or communities, and sends 22 deputies to the general diet. Formerly the burgomaster of Coire was perpetual chief of the league without election; but in the latter end of the 17th century the other communities claimed a power of nominating to this office in their turn. At length, by the arbitration of Zurich, it was decided, that the 22 deputies should choose two candidates from the members of the senate of Coire, who should draw lots for the charge. The chief thus appointed is called "Bundes-prefident," has several privileges which distinguish him from the chiefs of the two other leagues; he receives all the letters addressed to the republic of the Grisons from foreign powers, and is perpetual president of the congress, because that assembly is always held at Coire. See COIRE.
The league of God's house is divided into 11 high jurisdictions, and comprehends 21 communes.

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God's Mercy. Islands of three or four small islands at the N.W. extremity of Hudson's Itrats. N. lat. 63 45. W. long. 75.

Godwin, Earl, in Biography, a powerful Saxon baron, was the son of Wolfnoth, governor ofSussex, and he himself, at the ascension of Canute, was earl of Kent, and lord of very great possessions. When the Danish possessions of Canute were attacked by the king of Sweden, Canute took over as auxiliaries a body of English commanded by the earl of Godwin, who obtained a complete victory, which so delighted the king, that he bestowed his daughter in marriage upon him, made him large grants of land, and admitted him to the closest confidence. After the death of Canute, the succession being disputed between Harold Harefoot and Hardicanute, Godwin espoused the part of the latter, and was instrumental in preventing a civil war. It is reported that he afterwards concurred with Harold in a plan for destroying the two English princes, sons of Ethelred II. and Emma, and the murder of one of them, viz. Alfred, is imputed to the vaillads of Godwin. In the reign of Hardicanute the surviving prince Edward preferred an accenuation against the earl for the murder of his brother, and loudly demanded justice for the crime; Godwin, to appease the king, made him a present of a galleon finely gilt and decorated, rowed by four coremen, each of whom wore on his arm a gold bracelet, weighing fifteen ounces, and they were all armed and clothed in the most sumptuous manner. Hardicanute, delighted with the spectacle, forgot his brother's murder, and on Godwin's own testimony he was allowed to be acquitted. In 1041, he was so completely reconciled to Edward, that on the death of Hardicanute he was the chief instrument of promoting him to the succession of the crown: he now acquired much influence in the state, and was created duke ofWessex, and the counties of Kent and Sussex were annexed to his government. The friendship between Godwin and the king was not of long continuance. Upon his refusal to act against the inhabitants of Dover, who had incurred Edward's displeasure, he was threatened with the royal vengeance. The earl, feeling his own power, actually excited a rebellion against his sovereign. Edward now summoned to his aid the dukes of Northum-
which was in the gift of the college, to resign his fellowship. He retired to this situation in 1549, and having married, continued there peaceable and happy during the reign of King Edward, devoting what time he could spare from the duties of his office to the study of theology and physic, and on the accession of Mary, he became an object of Bonner's fury, and was obliged to resign his school, and turn his attention to physic. By the practice of this, he maintained his family till Elizabeth ascended the throne. He now resolved to follow the bent of his inclination, devoted his whole time to theological studies, was admitted to holy orders, and appointed chaplain to the bishop of Lincoln. He was shortly after introduced to the queen, who made him one of the Lent preachers. This poll, which was probably attended with little emolument, he filled eighteen years, with great high reputation, during which he received no preferment in the church; but, in 1567, he was promoted to the deanship of Christ-church, Oxford, and in the same year a prebend was conferred on him. In 1566, he was advanced to the deanship of Canterbury, and attended the queen in her visit to the university of Oxford, on which occasion he took his degree of D.D. with great applause. In 1584, after eighteen years residence at Canterbury, he was nominated by the queen to the vacant see of Bath and Wells. This honour did not augment the happiness of Dr. Godwin: in refiling the unjust claims of one of Elizabeth's favourites, he lost the favour of the queen herself, which so affected his mind, as to render him incapable of performing his episcopal functions. The affairs of his diocese, being left to the management of others, fell into such disorder, that his metropolitan, archbishop Whitgift, thought proper to visit it in the year 1587. At this time Dr. Godwin's health was in a very bad state, and he gradually became worse till he funk under the effects of disease, in his forty-third year. He is highly spoken of for learning and unaffected piety, and was beloved and respected for his cheerful hospitality, benevolence, and charity. Biog. Brit.

Godwin, Francis, the son of the preceding, was born at Hasting, in Northamptonshire, in the year 1561, and having been carefully educated in grammar learning, he was sent to Christ-church college, Oxford, where he was in his sixteenth year, and in 1578 he was elected a scholar of that institution. In 1583, he took his degree of B.A., and three years after he proceeded to his degree of M.A. About this time he wrote an entertaining philosophical fiction, which he did not at that period publish, because it contained ideas at variance with the fystems then prevalent in the schools. It was given to the world five years after his death, under the title of "The Man in the Moon, or a Discourse of a Voyage thither by Domingo Gonzalez." The hints, conjectures, &c. contained in this piece, prove that the author was not ignorant of the writings of Copernicus, and was probably a convert to his doctrines. In 1587, he was a canon in the cathedral church of Wells, and promoted to the subdeanery of Exeter. The history and antiquities of his country became favourite subjects of his enquiries, and in the year 1590 he accompanied the celebrated Camden into Wales, in search of objects to illustrate them. In 1595, he took the degree of doctor in divinity, being in opinion of very considerable and lucrative preferment in the church. He published, in 1601, "A Catalogue of the Bishops of England, since the first Planting of the Christian Religion in this Island, together with a brief History of their Lives and memorable Actions, so near as can be gathered out of Antiquity." As a reward for the great diligence used in the composition of this catalogue, the queen promoted him, the same year, to the vacant see of Landaff; being allowed to retain, in connection with the bishopric, the subdeanery of Exeter, and a good rectory in the diocese of Bath and Wells. He now employed himself in improving his "Catalogue," and in making collections relative to civil and ecclesiastical history. In 1615 he published a new edition of his "Catalogue," to which he prefixed a discourse "Concerning the first Conversion of our Britain unto the Christian Religion." It was afterwards republished in Latin, under the title of "De Pre-fulbus Anglica Commentarium." In the same year he published "Rerum Anglicarum Henrico VIII., Edwardo VI., et Maria, regnantibus, Annalæ," which was highly admired for the elegance of the style. By King James he was translated from Landaff to the bishopric of Hereford in the year 1617, and from this period, he devoted such time as the discharge of his episcopal functions would permit, chiefly to the improvement of his former works; but in 1629 he published a discourse on the fentral methods of conveying secret and speedy intelligence, with the title of "Nuncius Inamnatus, Utopia." It has been suggested that this was written in obsolete and enigmatical language, with a design of concealing the author's secret; but from certain expressions, it should seem, that the hints contained in it might have led to an earlier establishment of public telegraphs. Besides several editions of the Annalæ, and a translation into English of the same work, we have a learned dissertation by the bishop, on the value of the Roman fefcience and attive talent, which was printed at the end of Hakewell's "Apology of Divine Providence." This was his last labour in the field of literature. He died in 1633 in his seventy-second year. Of his learning and classical taste, his works bear most decisive evidence, and they exhibit him as a zealous friend to the establishment, of which he was a member. According to Anthony Wood, "he was a good man, a grave divine, a skilful mathematician, an excellent philosopher, a good preacher, and a strict liver; but so much employed in his studies and matters of religion, that he was a stranger to the world and the things thereof." Biog. Brit.

Godwin, Thomas, a learned English divine and writer on Jewish antiquities, was born in Somertfethire in the year 1587. In his fiftenth year, he was sent from the grammar-school to Magdalen-hall, in the university of Oxford, where he was entered a scholar. Here, in due course, he took his degrees, and soon after was chosen master of the free-school at Abingdon, in Berkshire. In this situation he distinguished himself by his diligence and affinuity in teaching good scholars, who afterwards became eminent in various departments of literature, and in polls of honour and emolument in the church and state. In 1614 he published "Romane Historia Anthologia," an English exposition of the Roman antiquities, which went through several editions. Shortly after this, he entered into orders, and was appointed chaplain to Dr. James Montague, bishop of Bath and Wells, and in 1616 he was admitted to the degree of bachelor of divinity, and published a work, entitled "Synopsis Antiquitatum Hebraica rum ad Explanicionem utriusque Telfameli vanitatae necessaria, &c." lb 3. 410. About this period he resigned his school, upon obtaining a presentation to the rectory of Brightwell, near Wallingford, in Berkshire. In the year 1625, he published the work by which he is chiefly known, viz. "Moises and .aron; civil and eccleiafical Rites, used by the ancient Hebrews, observed, and at large opened, for the clearing of many obscure Texts, throughout the whole Scripture." This work was immediately regarded as a standard book in our places of academical education, and has been repeatedly printed. In 1636, Mr. Godwin was admitted to the degree of doctor of divinity. He died in
in 1642. Besides the works already noticed, Dr. Godwin was the author of "Florilegium Piraeanum,"—or A Survey of the Latin Tongue. And Three Arguments to prove election upon firft principles. Gen. Bibl.

Godwin, or Godwin Sams, in Geography, a bank in the sea, about five miles from Deal, near the coast of Kent, England, formerly formed part of the estate of the celebrated Earl Godwin, but were parceled and overwhelmed by a sudden inundation of the sea, about the end of the eleventh century. These sands are frequently fatal to mariners, but, notwithstanding, are of considerable use, as it is by them alone that the Downs are constituted a road or harbour for shipping. In all calmer winds they serve as a pier, or breakwater, and greatly mitigate the force and immensity of the waves, which, in stormy weather, would otherwise roll upon this shore with unabated fury. The sands extend in length about ten miles; the north sand-head being nearly opposite to Ramsgate, and the south sand-head to Kingsdown. The danger of striking upon them arises from their nature, which Mr. Smason describes as that of a quick-fand, clean and unconnected, yet lying so close, as to render it difficult to work a pointed bar to the depth of more than fix or seven feet. Their ingurgitating property is so powerful, that even the largest vessel driven upon them would, in a few days, be swallowed up, and seen no more. At low-water they are in many parts dry, and parties frequently land upon them; but when the tide begins to flow, the sand becomes soft, and is moved to and fro by the waves. The largest portion of this bank which becomes dry, is known to be near by the name of the Jamaican sand. Some years ago, in order to prevent the many accidents which occur to shipping on these sands, the Corporation of the Trinity-house formed the design of erecting a light-house on them; but after the sand had been penetrated by boring augers to a great depth, the scheme was given up as impracticable, as no solid foundation could be obtained. Floating lights have, however, been placed off these sands, consisting of three distinct lights in the form of a triangle, of which the middle one is considerably the highest; when they are obscured in hazy weather, a bell is kept constantly ringing.

Godwit, in Ornithology. See Sculopax Egorolartha.

Godwit, Great, or American. See Sculopax Fadoa.

Godwit, Lesser. See Sculopax Lumnus.

Godwit, Red. See Sculopax Lapponica.

Godwit, White. See Recurvirostra Alba.

Goelans, Point au, in Geography, a promontory on the N. side of Lake Ontario; about 33 miles S. W. of Fort Frontenac.

Goelheim, a town of France, in the department of Monté-Comines, and chief place of a canton, in the district of Keiferlautern. The place contains 865, and the canton 4999 inhabitants, in 16 communes.

Goeliske, Andrew Otton, in Biography, a German physician, who acquired considerable reputation at the beginning of the eighteenth century, and taught the science of medicine at Halls, in Saxony, and at Frankfort on the Oder, with distinction. His writings were in high estimation among the followers of the doctrines of Stahl, of whom he was one of the ablest defenders. Nothing more is known respecting his life. He left several works, which relate principally to the history of anatomy, of ancient and modern surgery, and of medicine. His "Hiloria Medicina Universalis, quæ celebratissimorum quorumque Medicorum, qui a prima Artis natalibus ad nostra usque temporae inculcarunt, vitæ, nomina, dogmata singularia, rationes insignias, hypotheces, &c., accuratissimae, quæ praecipue in varis discentibus, nōnnullis eae temporibus, picturae, specimina, &c., accuratissimae," was printed in six different portions or epochs, between the years 1717 and 1720. The first four brought down the history to Hippocrates; the fifth treated of the Hippocratic medicine alone; and the last part included a sketch of the descendants of the father of medicine, until the time when the art was divided into three professions. Elsen, Dls. Hill.

Goelius, in Geography, an island of Denmark, in Lym- ford, about 10 miles in circumference; on which are a town and a village or two; 6 miles W. of Aalborg. N. lat. 57°. E. long. 9° 49'.

Goelmé, a port of Egypt, in the Red sea, capable of accommodating only small vessels.

Goelwara, a city of Hindostan, in Guzerat, on the W. coast of the gulf of Cambaye.

Goere, William, in Biography, who flourished in the 17th century, was born at Middleburg, in Zealand, in the year 1635. He had a decided turn for literature, but by the death of his father while very young, he was confined to the care of an illiterate stepfather, who would not permit him to pursue the bent of his mind. Being obliged to fix upon a trade, instead of studying for one of the learned professions, he fixed on that of a bookseller, as that which he imagined best adapted for the improvement of his leisure hours in the acquisition of knowledge. His various works shall show how well he filled his time, and to what advantage he turned those intervals from occupation, which are too frequently spent in little trifles or devoted to pleasure. He died at Amsterdam in 1711, leaving his "Jewish Antiquities," in two volumes, folio. "The History of the Jewish Church," in four volumes folio. "History Sacred and Profane," "An Introduction to Painting" "A Treatise on Architecture;" and other useful works. Morei.

Goerzeod Ghezer, in Geography, a town of Alk- cterrain Turkey, in Natolia: 25 miles S. of Sinod.

Goet, a town of Portugal, in the province of Beira; 9 miles E. of Oeimbra.—Alto, a town of Holland, in Zealand, called "Ter-Goet," situated on the N. coast of the island of South Bevelands, on an arm of the Scheldt, with which it is connected by means of a canal. The great church is a handsome structure; and though the town is not large, it carries on a considerable trade, particularly in salt and grain; to miles E. of Flushing. N. lat. 51° 33'. E. long. 3° 49'.

Goetia, Færides, a species of magic, opposed to Theurgy, the object of which was mischief; and accordingly it invoked only the malevolent genii.

Goetz, Damiana, in Biography, a learned Portuguese, of the 16th century, was born at Alenquer, and educated in the court of the king Emanuel, to whom his brother was gentleman of the chamber. He was, as he advanced in life, employed in various negotiations from his court to the court of France, Germany, Poland, and the Low Countries. In 1534, we find him at the university of Padua, in which he studied four years under Buonomico, and contracted a friendship in Italy with Bembo, Sadolet, and other great men. He carried forward his studies at Louvain, where he fixed his residence after his marriage, and was the principal means of defending the city against the attack of Martin van Rossem. He was, however, feized by the enemy, under the pretence of a violation of the truce, and obliged to ransom himself. He was after this recalled by the king of Portugal, who wished to employ him to write the history of that country. The materials put into his hands were so confounded a file, and so fanciful in regard to quantity, that he was able to perform but a small part of the task. He was maliciously accused, arrested, and thrown into prison. At length, as there was nothing found against him, he was liberated, and return-
ed to his own dwelling, where he was shortly after found burnt to death; but the works of this enthusiastic, probably, of an apoplectic fit. His works are, "Legatio magni Iudorum Imperatoris ad Emanualem Lutitanac Regem," "Fides, Religion, Moræque Ethipion." "Hilpinaci Laudatio," "Urbis Laurinianus Obidido," "Comment Rerum Gotharum in India à Lutitanis. " "Urbis Ulybipponensis Descriptio. " "Historia del rey Dom. Manuel." "Chronica de Principe D. Juao II." Moret.

GOEZE, John Augustus Ethn, was born at Aachon in the year 1734, where he received the elements of a learned education. He was afterwards sent to Halle to pursue his studies preparatory to the exercise of the profession of preacher. In 1751 he settled in that capacity at Quedlingburg, which he retained till the period of his death. It was not till he was about forty years of age that he turned his attention to the microscope and natural history, for his skill in which he afterwards became so famous. At first he made use of his microscope only for amusement, but in a short time he found himself so instructed in the use of the instruments that he performed the most minute and highly complicated operations on the subject. He translated Bonnet's treatise on entomology, which met with a very favourable reception from naturalists. He set out without regard to money or order, but soon found that systematic knowledge was necessary in his pursuits; and completely acquainted himself with the Linnean arrangement; and his "Entomological Collections" were intended as a supplement to the works of the Swedish naturalists. The next considerable work of Goze was on the natural history of intestinal worms, which he published in quarto in 1782. This work contributed greatly to encrease his reputation as a naturalist, and entitles him to an honourable place among the discoverers of modern times. The interest which he took in the education and improvement of his own children led him to publish some works on natural history, intended particularly for young persons in general, and being a very agreeable as well as learned writer, his productions were well received, and to his honour it must be spoken that he never forgot to cultivate the duties of religion and morality while he was devoting the wonders of the natural world. After he had communicated to the public the result of his observations on intestinal worms, he sent his collections to Pavia, where it was sold for a thousand dollars. His fame, however, had extended much beyond his own country, and within a few weeks after he had parted or at least agreed to part with his curious collection for the above named price, he received a letter from Dr. Hunter, offering him nearly double the sum for it. He died in June 1786.


GOFABAD, in Geography, a town of Persia, in the province of Iran: 55 miles E. of Isphahan.

GOFFE. See GOFF.

GOFFSTOWN, a town of America, in Hillsborough county, New Hampshire, situated on the western bank of Merrimac river, 35 miles from Amhurst falls, or 62 miles W. of Portsmouth. It was incorporated in 1761, and contains 1612 inhabitants.

GOG and MAGOG, in Scripture History, are names generally connected in the sacred writings. (See Ezek. xxxviii., 2, 3, 4cow. xxix. 1, 2, Rev. xx. 8.) Moses (Gen. x. 2) speaks of Magog, the son of Japheth, but says nothing of Gog. According to Ezekiel, (vjd supra,) Gog was prince of Magog; the latter signifying the country or people, and the former, the king of it. The ancients generally represent Magog as the father of the Scythians or Tartars; and traces have been found of the name in the provinces of Great Tartary. Others say that the Persians are descendants of Magog; and to this purpose people have been found there called Magogians, and philosophers called Magoloi or Magi.

Some have imagined that the Goths were descended from Gog and Magog: and that the wars described by Ezekiel, and undertaken by Gog against the saints, are that one which the Goths carried on, in the 5th century, against the Roman empire. Bochart has placed Gog in the vicinity of Caucasus; and he derives the name of this celebrated mountain from the Hebrew גוג גוג-כסאן, the fortress of Gog. He also says, that Prometheus, said to be chained to Caucasus, is Gog; and it may be observed, that there is a province in Iberia S. of Caucasus, called the Gogarene. Most persons are of opinion, that Gog and Magog, in Ezekiel and the Revelations, are taken, allegorically, for such princes as were enemies to the church. Accordingly many, by Gog in Ezekiel, understand Antiochus Epiphanes, the persecutor of the Jews; and Gog in Revelations, they suppose to represent Antichrist. Calmet apprehends that the Gog of Ezekiel and Cambyses, king of Persia, were the same persons. The Armenians are of opinion that the descendents of Gog and Magog inhabit the northern parts of Asia, beyond the Tartars and Scythians: and hence it is probable that Gog and Magog, according to the notions of the Armenians, formerly inhabited the mountains of the Hyperboreans, and that they were known to the ancients by this name. This nation is unquestionably famous in antiquity, and there is reason for imagining, that they were some of the Scythians, and confounded among the Great and Little Tartars, and perhaps among the Muscovites, and other northern people. Calmet.

GOG-MAGOG HILLS, in Geography, hills so called, about three miles from Cambridge, remarkable for the intrenchments and other works found there, and supposed by some to be a Roman camp, and by others, a work of the Danes. GOG, a town of Abysinian; 30 miles S. of Gondar. Alto, a small town of India; on the western side of the gulf of Cambaya, about 28 or 30 leagues from Cambaya, abounding with banyans and fen-men.

GOGARD, a town of Sweden, in East Gothland, 23 miles N.N.W. of Linkoping.

GOGARENA, in Ancient Geography, a country of Asia, in Armenia. Strabo.

GOGARY, in Geography, a town of Bengal; 24 miles N.W. of Boglapur. N. lat. 25° 26′. E. long. 86° 36′.— Alto, a town of Hindooftan, in Bahar; 10 miles N.E. of Monghir.

GOGAVINUS, Antonius Graianiensis, or Anthony Gogavine de Grave, in Biography, a laborious writer, who, according to the indications of the famous Zarlimo, published in corso all the ancient authors on music, at Venice, 1562, 4to.

His compilation contains the books of Aristoxenus and Ptolemy, and the fragment of Ariotile, with the Commentary of Porphyry, the whole enriched with notes by Bottirgi. See MEHRISMUS, and BOTRIGARI.

GOGET, in Ichthyology. See GEBUS NGER.

GOGGLES, in Rural Economy, a morbid affection in 3 G

hep.
sheep, which is sometimes extremely destructive to them. It is suggested in the Bath papers as first playing itself, by a dropping of the ears, and frequent rubbing of the tail; but not to have any relation or affinity to giddiness, as the sheep do not run round as in that disease. It appears to have the greatest resemblance to the disorder called the flagggers in the lungs; but differs in no small degree, as the flaggery lungs display weaknefs before, and of course fall in that direction, while the goggly sheep shew weaknefs behind, and when forced to run fall backwards. Sheep under this disorder constantly get poorer and poorer, and become more weak, until they are not able to drag their lungs after them, and consequently die. Some have contended that it is a disease of the paralytic kind, and that the feat of the complaint is in the spinal marrow. It was formerly either wholly unknown, or unattended to by sheep-farmers, as it is now mentioned.

Hitherto no satisfactory method of cure has been pointed out for the disease, but warmth and frequent change of posture have been found beneficial in it.

Goggles, or glasses, are instruments used for curing eye-sinati, or that disfigurement of the eyes which occasions this disorder. They are thin conical tubes, composed of ivory flamed black, with a thin plate of the same ivory fixed in the tubes near their anterior extremities. Through the centre of each of these plates is a small circular hole, about the size of the pupil of the eye, for the transmission of the rays of light. These goggles must be continually worn in the day-time, till the muscles of the eye are brought to act regularly and uniformly, so as to direct the pupil straight forwards; and by these means the cure will be sooner or later effected. Warner on the Eye, p. 52.

GOGMOW, in Geography, a town of Hindoostan, in Ouade; 35 miles N. of Manjakpour.

GOO. See GOGA.

GOGODUNGA, a town of Bengal, on a small island formed by a branch of the Hoogly; 45 miles S. of Calcutta.

GOGOROMOW, a town of Guzerat, on the coast; 50 miles W. S. W. of Noonagur.

GOGRA, also called Deusah and Soorge, a river of Hindoostan, which proceeds from a lake named Lanke-Dhe, having to the E. of it another larger lake, named Manfaraw, both situated on the western side of Thibet, and forces its way through the vast ridge called Himmalack, and afterwards joins the Ganges. See DEWAL.

GOGUET, ANTONY-VEIS, in Biography, was born at Paris in 1716, where his father was an advocate. He himself became a counsellor to the parliament. By close study and by great industry in his pursuits, he produced in the year 1758, a work that has obtained a high reputation, and which has been translated into the English and other languages. It is entitled "L'Origine des Lois, des Arts, des Sciences, et de leur Progress depuis les anciens Peuples," in three volumes 4to. It was printed in 1778, in six volumes 8vo. This work treats of the origin and progress of human knowledge, from the creation to the age of Cyrus, and displays much erudition in historical discussions, though much of science and philosophy than might have been expected. He died of the small-pox almost immediately after the publication of this valuable work. He was a man of much private worth, modest and unassuming. He had begun another work on the Origin and Progress of the Laws, Arts, Sciences, &c. in France, from the commencement of the monarchy.

GOHANA, in Geography, a town of Hindoostan, in Ballooban; 54 miles W. S. W. of Delhi.

GOH, a town of Hindoostan, in Ballooban; 35 miles W. N. W. of Safarum.

GOHUD, a circar of Hindoostan, in the southe of Agra, lying on the right side of the river Jumna. It is bounded on the N. by the Chumbal, on the E. by Doob and Ouade, on the S. by Buckul, and on the W. by Rantampour and Cottah.—Alfo, a town of this circar, the revenues of which are estimated at 20 or 30 lacks of rupees per annum; 55 miles S. E. of Agra. N. lat. 26° 24'. E. long. 78° 43'.

GOI, a town of Croatia, on the river Mreznitas; 18 miles S. of Carlistadt.

GOJAM, a province of Abyssinia, about 80 miles in length, and 40 in breadth. It is a very flat country, altogether appropriated to pasture; it has few mountains, but there are very high, and are chiefly on the banks of the Nile, to the south, which river surrounds the province. Gojam is full of great herds of cattle, which are the largest in the high parts of Abyssinia. The country is populous, but the men are in the lowest estimation as soldiers. The Jefuits were settled in many convents throughout the province, and are held in the utmost detestation. The monks are theos of St. Euliatius, which may be called the Low Church of Abyssinia; they are said to be much inclined to turbulence in religious matters, and are, therefore, always made tools by discontented people who have no religion at all. On the S. E. of Gojam is Damot; which see. Bruce.

GOJAS. See GOYAS.

GOJAY, a town of Africa, on the Grain coast; 25 miles S. E. of Grand Sotto.

GOJEIDA, or GOUIA, a town of Algiers; 50 miles S. E. of Oran.

GOING, in the Mouse, called in French allcure, is the place or seat of a horse.

GOI, GURT, Gar, Locat, &c. are names for a ditch or trench for conveying water, used by engineers and miners of different districts.

GOITO, in Geography, a town of Italy, in the department of the Mincio, situated on the river Mincio, between the lake of Mantua and that of Garda; 9 miles N. N. W. of Mantua.

GOITRE, or GOUTIER, in Surgery, names sometimes applied to a morbid enlargement of the thyroid gland. See BRONCHOCELE.

Perfons labouring under this complaint are found in various mountainous districts of Europe, in China, in Bootan, and many other regions of the East, in Ceylon, &c. (See CRETINS.) Turner, in his "Account of an Embalmy to Tibet," says, that in Bengal this unhallowed tumour is known by the name of "Cheig," and "Aulx;" and in Bootan is called "Ba Ba," or "Ke Bé," the neck-swelling, and that it forms itself immediately below the chin, extending from ear to ear, and sometimes growing to such an enormous size, as to hang from the throat down upon the breast. It is particularly observable, he says, among the inhabitants of the hills of Bootan, immediately bordering upon Bengal, and in the tract of low country watered by the rivers that flow from them to the south, beyond the space of a degree of latitude. The same malady prevails among the people inhabiting the Moring, Nipal, and Almora hills, which, joined to those of Bootan, in continuation, and bound, to the northward, that extensive tract of low land embraced by the Ganges and the Berhampooter. The same disease is also more particularly met with in the low lands adjoining to these hills. From the frontier of Affan, N. lat. 27°. E. long. 91°, it is to be traced through Dimchar, Gouch Bahar, Rungøre, Dimapore, Pacha, Turcoo, and Behagh.
G O L

along the northern boundary of Oude, in Goorapore, Baratich, Pilibhit, and on the confines of Rohilkund, to Hur- dewar, situated in N. lat. 30° E. long. 78° 15'. It has the effect, he adds, or rather is accompanied with the effect, arising from the same cause, of debilitating both the bodies and the minds of those who are affected with it. Marsten, in his "History of Sumatra," observes, that it has been usual to

attribute this affection to the badlands, thawed flat, mineral quality, or other peculiarity of the waters: "My experience," he adds. "enables me to pronounce without hesita-

tion, that the disorder, for such it is, though it appears here to mark a distinct race of people, (orang geanang,) is immediately connected with the hilliness of the country, and, of course, if the circumstances of the water they use contribute thereto, it must be only so far as the nature of the water is affected by the inequality or height of the land. But in Sumatra neither snow nor other congelation is ever produced, which militates against the most plausible conjecture that has been adopted concerning the alpine goitres. From every research that I have been enabled to make, I think I have reason to conclude, that the complaint is owing, among the Sumatrans, to the fogginess of the air in the valleys, between the high mountains, where, and not on the fumits, the natives of these parts reside. I before remarked, that between the ranges of the hills, the "ca-

boot," or dense mist, was visible for several hours every morning; lining in a thick, opaque, and well-defined body, with the sun, and seldom quite dispersed till afternoon. This phenomenon, as well as that of the wens, being peculiar to the regions of the hills, affords a premonition that they may be connected; exclusive of the natural probability that a cold vapour, groats to an uncommon degree, and continually enveloping the habitations, should affect with tumours the throats of the inhabitants. I cannot pretend to say how far this dissolution may apply to the cafe of the goitres, but I recollect it to have been mentioned, that the only method of curing these people is by removing them from the valleys to the clear and pure air on the tops of the hills; which seems to indicate a similar source of the dis-
temper with what I have pointed out. The Sumatrans do not appear to attempt any remedy for it, the wens being confident with the highest health in other respects."  

GOKAUP, in Geography, a town of Hindooollan, in Vifapour; 16 miles S.S.E. of Raiboug. 

GOKLA, a town of Turkish Arabia; 30 miles E.S.E. of Akhaldz. 

GOLABAD, a town of Persia, in the province of Irak; 45 miles E. of Ipahan. 

GOLAH, a town of Hindooollan, in Bahar; 10 miles E. of Rangpur. 

GOLAN, a town of the duchy of Warfaw; 10 miles N.E. of Pofen. 

GOLAPILLY, a town of Hindooollan, in the circuit of Guntoor; 10 miles W. of Innacolsa. 

GOLAWARRY, a town of Bengal; 48 miles N.W. of Midnapour. 

GOLCONDA, a province of Hindooollan, part of the possessions of the Nizam, or Soubah of the Deccan, our firm ally, corresponds to the ancient province of Tellingang, or Tellung, situated between the lower parts of the confines of the Kñath and Godavary rivers; and is bounded on the N. by Berar, on the E. by the Circars, on the S. by the Muffree country and the Carnatic, and on the W. by Dow-

largei, and Vifapour. It takes its name from a famous fortres. The kings of this country were, at a former time, immensely rich and powerful; as they maintained in their pay 500,000 soldiers, and derived very large revenues from

their lands, customs of merchandizes and provision; but chiefly from the diamond mines, for which this country has been singularly famous. The winter in Golconda begins in June with rain and thunder; the rain pouring down, accompanied by violent storms of wind, till the middle of July, with occasional intervals of fine weather. In August, September, and October, the rains again fall, and very much swell the rivers. These rains render the land exceedingly fertile, particularly in fruits. Vines are plentiful, and of the grapes, which ripen in January, they make white wine. Two crops of rice are produced annually, and the country affords other kinds of grain. The capital of Golconda is Hyderabad. 

GOLCONDA is also the name of a fortres, surrounded by stone walls and deep ditches, which was formerly the residence of the kings of the country. This fortres, on account of its extent, might be denominated a city; a hill rose in the middle of it like a sugar-loaf, and the sides of it were encompassed by the king's palace, which was very large and well situated for air, and which had a good view of Hyderabad. When Aurungzebe conquered the kingdom of Golconda in 1687, this fortres was taken by treachery; the king offered to pay a tribute of 3,750,000 rupees, and become the servile of the conqueror; but he refused, and entered the palace in triumph. 


Mineralogical Description.—This metal never having been found in a mineralized state, we are acquainted with one species only, namely, 

Native gold, which is subdivided by Werner into three sub-

species, viz. gold-yellow, brazi-yellow, and greyish-yellow gold. Though this subdivision may appear arbitrary, and not found-
ed on constant characters exclusively belonging to each of the above varieties or sub-species, it is nevertheless entitled to attention, since colour, however unimportant it may be in the classification of earthy fossils, constitutes a character of considerable value in native metallic subfossils, the range of whose colours is confined to a narrow compass. But also their geognostic relation appears to constitute a dif-
tinction, at least between the two first of the Wernerian sub-species; for as to the third, or the greyish-yellow gold, its claims to be kept separate from the two others appear doubtful; all we know of it is its being found in small flat particles, along with that mixture of different metals called plati-
tina in grains, of whose colour it partakes in general, and with which it is suppos'd to have occurred also originally under the same geognostic relations. 

1. Light or Brazi-coloured native Gold. Melting-gold, gedigen gold of Werner. Its colour is pretty well indicated by its name; but it varies in intensity from what may be called pale-gold yellow to yellowish-filvery white. It is also sometimes found with deep-yellow, and with pavonine tarnish. 

It occurs massive, disseminated in angular and amorphous particles, but more frequently in films, membranes, and plates even and curled or twisted, and with smooth or drusy sur-
fase; also capillary, tooth and wire-shaped, shrub and fern-
like, and as mouldiform flings; often imitating reticulated and filigree work; all which forms are generally produced by the aggregation of minute imperfect crystals. Among these, perfect crystals are not unfrequently seen, sometimes single, often in groups, on the margin of the plates, &c. The growing secondary forms have been observed: the cube; the octahedron; the eubri-cheladon; the hexocto-

dodecaedron with trigeminal plates. Also modifications intermediate between the cube and the octahedron occur, but they

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are scarce. The minute three-sided pyramids, which are often seen to druse the membrane, and the simple triangular marks on the plates of the Transylvanian native gold, are the results of hurried and disturbed crystallization; the former of them being the solid angles of the cubical, and the latter the rudiments of the octahedral variety.

The crystals are minute (those described by Mr. Esmer as octahedra and cubes of two lines in diameter, have never before been heard of; their surface is always smooth.

Lustrous metallic: externally splendent; while that of the grains is sometimes glittering, sometimes approaching to dull; internally it is glittering and glittering.

The fracture of gold is fine hackly. Its fragments are indeterminately angular.

It is soft, highly flexible, malleable, and ductile.

The specific gravity of pure gold is from 19.253 to 19.645; but that of the brassy-yellow variety, owing to a greater proportion of silver with which it is alloyed, is generally considerably less, though always above twelve.

The light, or brassy-yellow gold, occurs almost always in veins in greywacke, greywacke slate, and newer porphyry; seldom, as the following sub-species, in primitive rocks, or under other circumstances that bespeak a similar remote antiquity.

It occurs chiefly with quartz and iron pyrites, and not unfrequently with grey antimony. Other concomitant substances are, among the earthy fossils, calcareous spar, iron pyrites, barites, felenite, and feldspar; of metallic substances, red and vitreous silver ores, (feldspar native silver,) copper pyrites, grey copper ore, copper green, brown iron flume, galena, green lead ore, blende, with occasional traces of white cobalt, copper nickel, red orpiment, native arsenic, and arsenical pyrites.

2. Deep or Gold-yellow Native Gold.—Gold-calcos gediegen-gold of Werner.

Its colour is the highest gold-colour, seldom verging on brassy yellow.

It occurs massive and in small roundish and flattened pieces, as also in grains of various dimensions, detached or disseminated; seldom in particular external forms, such as in leaves and laminar, fibrous and mottled; scarcely ever crystallized: almost all the crystalline forms described by authors belonging to the light-coloured sub-species.

External lustre: glittering, sometimes (as in the variety called Spanish mufli) disseminated of all lustre. Its specific gravity is rather greater than that of the light or brass-coloured gold, with which it agrees in the remaining characters.

It occurs mostly loose, in alluvial situations, and in the sand of rivers, and, as such, appears to have been originally disseminated in rocks of ancient formation: it is, however, also found in veins in Norway, Siberia, Bohemia, Hungary, in the East Indies, &c. almost always disseminated in quartz, accompanied by iron-pyrites; but nothing is as yet known respecting the age of these veins. At Fattsebay it is found in minutely mottled external form, often of a dull powdery appearance, on common quartz sometimes mixed with iron pyrites; in this state it is by the miner called Spanish mufli.

Cry stalline substitution.—The following localities comprehend both the sub-species into which native gold is divided by Werner. By far the greater part of that found in Europe belongs to the brassy-yellow sub-species, except the gold of rivers and alluvial foil, which is principally deep yellow, and to which the immense quantities of this precious metal, furnished by the other parts of the world, appear likewise to belong.

Europe.—Hungary, the Banat, and principally Transylvania. In Upper Hungary it occurs in greifs; at Schamitz, in Lower Hungary, it is found accompanied with several silver ores, and with galena; at Kremsitz, in and on cellular and flattered quartz, lamellar barytes, with vitreous silver and grey copper ore, copper pyrites, brown spar, &c.; at Orava in the Banat, it occurs siliforn and disseminated in pale flesh-red and greenish-white limestone, with white cobalt ore and copper nickel. In Transylvania, the richest country of Europe in this metal, it principally occurs in a kind of clay-porphyr of different degrees of hardness, which is the Saxum metaliferum of Born, in greywacke and granite slate; at Kapnik it is sometimes found with red orpiment; at Staniš in calcareous spar, mixed with arseneous pyrites, &c.: other places of Transylvania abound in gold (which is for the greater part brassy-yellow), are Verebipatsz, Abruclany, Boiza, Offenbanya, Fatzebay, Toplitz, Traibhyan, &c. Also the rivers, both of Hungary and Transylvania, are richly auriferous; gold sand is found in the Nera, and underneath a dratum of chalk on the plain traversed by this river. The richest river of Transylvania is the Araníoth, and the plain bordering on the river Moróth, contains likewise gold in grains, between a dratum of mould, and another of schistus, either of which flata is in the leaf auriferous. Also at Olápin, gold is obtained by washing; it is there mixed with magnetic ironstone, titanium, garnet, and cyanite. The gold of the great rivers of Transylvania is generally of 21 carats, that of Olápin and Rothinar is even of 23 carats, six grains.

In Germany it is found in several places, at Johangeorgenbadt in Saxony, in Carinthia, where it accompanies copper ores, in Tyrol and Salzburg; but it is only in the lat of these districts, or rather in the chain of mountains, separating Tyrol from Carinthia, that gold-mines are worked: in the Zillerthal it is found in various external forms, and accompanied with iron-pyrites, &c. in mica flume. In Bohemia gold occurs in quartz.

Spain is probably very rich in gold; certain it is that considerable gold mines were worked there in former times, and, according to Diodorus Siculus, as far back as the time of the Phoenicians, after whom the Romans undertook to work them; and Pliny informs us, that those nations derived great profit from them. Altdorf was the province which furnished most of this metal. After the discovery of America these mines were entirely given up and lost. The Tagus and some other rivers of Spain are likewise auriferous.

France has no gold mine that is worthy to be worked; the first discovery of gold in that country was made in 1781, at la Gardette, in the valley of Oyons, in the present department of the Ifere; the mine was worked for six years, but the produce in gold and accompanying minerals was too small to compensate for the expense of obtaining them, and, indeed, the lobs amounted to upwards of 21,000 livres. It occurs there, with rock cryllals and iron pyrites, in greifs. The sand of several rivers of France is auriferous, such as that of the Arrive near Mirpoix, the Gardon and Ceze in the Cévennes, the Rhone in the Pays de Gex, the Rhine between Straiburg and Philippburg, the Salz in the neighbourhood of St Giron, in the Pyrenees, the Baronne near Toulouse, and the Hérsalt at Montpellier. Also most of the black sand and of the bog-iron found in the neighbourhood of Paris is laid to contain a small quantity of gold.

In Piedmont veins of auriferous pyrites and quartz are found near Macugnaga, at the foot of Monte Rosa; which mountain consists of veined granite in horizontal beds. The veins of pyrites and quartz have upon the whole a perpendicular direction, but in some parts they cross each other, and
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and where this takes place, groups, or nests, are found which contain the greatest proportion of gold. The proprietor of these mines extracted out of such nests, in no more than twenty-two days, 189 mares of pure gold, although a hundred weight of the ore yields no more than from 10 to 12 grains of that metal. Formerly upwards of a thousand workmen were employed in these gold-mines, and the present priors still procure 80 mills, by which from 16 to 12 pounds (of 12 ounces) of mercury impregnated with gold are produced per day. Twelve pounds of mercury contain two mares of gold. There are likewise several auriferous rivers on the S. side of the Alpenine Alps, between Mount Rofa and the valley of Aola, such as the Avonfan, which runs from the valley of Chaltant into the Doire, and where some gold-mines were also worked by the Romans; the Oreo, &c.

Sweden has a gold mine at Edelfors in Smoland: the gangue, a brownish quartz, is laid to be in a kind of hornblende slate, which also contains the metal disseminated.

Gold has also been found in Great Britain: in Cornwall; at Leadhills, in Scotland, disseminated in quartz; at Wicklow, in Ireland, under the soil, and in a stream which runs over rocks of clay-slate with veins of quartz. It belongs to the deep yellow variety.

Africa.—The gold-ores of Siberia are partly of the light coloured, but principally of the deep coloured variety; that of Bearcots, which occurs in pyrites, or rather brown iron stone, and iron quartz; and in the rock which serves as gangue to the red lead ore, belongs to the latter. Patrin mentions a specimen of gold in fragments on hornblender, found in one of the silver mines of Schlangenberg.

The geographical relation of the gold found in several parts of India, in Japan, the Philippine and Malay islands, Sumatra, Borneo, &c. is not known; all the specimens from India, that have come under our inspection, were in the form of small rounded and amorphous particles in quartz, and belonged to the deep yellow variety.

Africa.—Of the occurrence of gold in this part of the world we know so much, that the greatest part, at least of that which comes to Europe, is deep yellow and in grains. African travellers have made us acquainted with a few of its localities, but not with any particulars relating to its geographical habitats. Though the commerce of gold-powder extends almost over the whole of Africa, yet, according to Herenn, there is none to be found in its northern parts. Among the principal African gold mines are those of Kordofan, between Darfur and Abyssinia, mentioned by Browne. The ancients, says Bronniart, appear to have been acquainted with these mines; they considered Ethiopia as a country rich in gold; and we find in Herodotus, that the king of that country exhibited to the ambassadors of Cambyses all the prisoners of war fettered with chains of gold.

A second most considerable district for gathering gold-powder appears to be southward of the great defart of Zahara, in the west of Africa, at the foot of those lofty ridges of mountains on which originate, among many smaller rivers, the Senegal, the Gambia, and Niger. The country of Bomahou, at the N.E. of those mountains, is, according to Golberry, which furnishes the greatest quantity of gold which is found on the west coast of Africa, from the mouth of the Senegal to the Cape Palmas. This gold is found in fragments and small lumps, principally near the surface of the earth, in the beds of rivulets, and always in a ferruginous soil. In some parts of the country the negroes sink something like shafts, but without giving any support to the sides of the pit; nor are they wont to follow up the vein, if any should appear, or to make galleries. The metal is obtained by repeated washing of the earth that includes it. The same country furnishes likewise the greatest part of the gold carried to Morocco, Fez, and Algiers, by the caravans which, from Tombuctoo, travel through the great defart of Zahara. The gold which is brought to Cairo and Alexandria from Sennaar comes likewife from thence. See Parke's travels, where also an interesting account is given of the gold in Manding, and of the procures by which the negroes obtain it.

The third principal district of Africa, for collecting gold, is on the S.W. coast, between 15° and 23° S. lat. opposite Madagascar. This gold comes principally from the country of Solaha. According to the relation of some travellers in this part of the world, the gold is found there not only in powder, but likewife in veins. Some are of opinion that the country of Ophir, from whence Solomon obtained gold, was situate on this coast.

America.—The gold of this part of the world, as far as we are acquainted with it, is so equal to the production of the sand of rivers and of alluvial land; but it is also, though rarely, found in veins. South America, particularly Brazil, Choco, and Chili, are the countries that yield most; but some is also found in North America, particularly in Mexico, where it occurs along with silver-ores. The annual produce of these Mexican mines is valued at from 12 to 1500 kilograms. All the rivers of the Caraccas, 10 north lat, are auriferous.

The gold of Chili, according to Frezier, is lodged in the alluvial formation.

The Peruvian gold occurs in ferruginous quartz; that of Choco, the richest province in gold in South America, is found as grains in alluvial country, and in rocks belonging to the new detz-trap formation. Almost all we know respecting the geographical situation of the gold of Spanish America, we owe to M. de Humboldt.

Brazil furnishes gold in abundance, and it is from thence that the greatest part actually seen in commerce is brought to Europe. There are, however, properly speaking, no gold-mines in that country; the gold is not found there in veins, but disseminated in sand and other alluvial deposits, out of which it is obtained in the usual manner.

The gold that has been furnished by Brazil within 120 years, may be valued (according to Correa) at 2,400,000,000 of French livres; and, according to other authors, the amount is calculated to be 24,000,000 per annum. Bronniart. See Ores.

Observations.—1. It would appear that most writers who adopt Werner's distinction between gold-yellow and brass-yellow gold, have mistakenly described the one sub-species for the other, and some even speak of "grey-yellow gold from Transylvania." The sub-division alluded to may be deemed inadmissible; but if it be at all adopted, by far the greater part of the native gold of Transylvania and Hungary, and consequently almost all crystallized gold, must necessarily be referred to the light-coloured, and that found in the sand of rivers to the deep-coloured sub-species; and this not on account of their colour only, but also indicative of differences in the chemical composition of metals, but principally on account of the geographical relations under which they respectively occur, and on which great stress appears to be laid by Werner.

2. Iron pyrites, containing not unfrequently a considerable portion of gold, in most cases invisibly diffused, and diffused, has been been considered as a species of gold ores; a distinction to which (though such auriferous pyrites are often subjected to metalurgical treatment for extracting that metal, as will be seen hereafter) it cannot be considered as entitled. See Pyrites, Auriferus.
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The brown cubic crystals from Beref, in Siberia, which contain grains of gold, are considered by some as decomposed, by others as hepatic pyrites, and by some as brown iron stone in fupposititious crystals. Whatever they may be, they are certainly not what Werner means by hepatic pyrites.

3. The native gold of Transylvania is often accompanied, and sometimes inculted, by particles of a pale yellow curdulent substance, which was considered by Hacquet as an oxide of gold. Muller and others have described it as iron-ochre, from which, however, it appears to differ both in colour and consistence. It is almost always to be met with in the specimen of native gold from Verehpahtak, but sometimes in fine, fine particles as to appear merely as a tarnish on the metal. It is to this dust probably that the gold ore, called Spanish fluff, owes its name, yellow-brown colour. It deserves further examination.

4. The grey metallic substance occurring as accicular indeterminat crystals, along with the gold of Siberia, in quartz, and which has been described as tellurium, as grey copper ore, &c. appears to be native bismuth.

For the chemical characters of gold, and the use to which it is applied, see the sequel of this article.

Extraction of Gold.—This metal is obtained separate from foreign substances, with which it is mixed by amalgamation with quicksilver. After it has been freed, by pounding and washing from the muller matter, it is triturated with about ten times its weight of mercury. The more fluid part of the amalgam is forced through leather, while that which is more consistent, and which contains the chief part of the gold, remains. This subjected to distillation, the quicksilver is separated and evaporated, and the gold remains in a state of fusion. When this metal is found in other ores, they are first roasted, to difperse the volatile principles, and to oxidize the other metals. The gold, which is but little subject to oxidation, is extracted by amalgamation, by cupellation, or other methods adapted to each ore, according to its properties or constituent parts. The metal obtained in these ways is always more or less alloyed, particularly with silver and copper. The first step in its purification is the process of Cupellation, to which article in our Cyclopaedia the reader is referred for accurate information on this part of the subject.

The gold, after it has been submitted to this process, is often alloyed with silver, which, being nearly as difficult of oxidation, is not removed by the action of lead, and hence the necessity of the operations denominated Parting and Quatification, which may be explained in a few words.

In Parting, the metal is rolled out very thin, and cut into small pieces, which are digested in diluted nitric acid moderately hot. The acid has an action upon, and dissolves the silver, leaving the gold undissolved in a porous mass. When, however, the proportion of silver is very small in comparison of the gold, the latter sometimes protects the former from the action of the acid; in such cases the previous step of Quatification is employed, which is so named on account of the proportion of material employed. viz. three parts of silver, with one of gold, and then subjecting the alloy, rolled out, to the operation of the acid. Sometimes they are melted together, and sulphur thrown in, the sulphur combines with the silver, and the gold falls to the bottom. It is observed by Lagrange, that rolling and annealing are operations very necessary to the success of the parting process, and which require some precautions. If the plate must not be too thin, lest it should break in consequence of the motion communicated to it by the action of the acid; if it is too thick the acid could not penetrate to its centre.

The annealing of the plate, at the same time that it gives pliability, facilitates its being rolled without cracking; it also opens the pores of the metal, which the rolling may have closed together, and by these means favours the action of the acid.

The process recommended by Bergman is this: first to dissolve it in nitro-muriatic acid; the silver is deposited spontaneously in the form of muriate of silver, which is insoluble; the gold is precipitated in fine powder by the sulphate of iron. Each of the above-mentioned processes is performed in such a manner as to lead to an estimate of the quantity of gold, and also of the different metals with which it is alloyed.

Gold, it is said, by some able French chemists, as Le Sage and Ronelle, exists in the vegetable kingdom, having, in experiments instituted for the purpose, been extracted from the nches of certain plants; the quantity, however, being, of course, too trifling to be sought after for practical purposes, it is sufficient merely to mention the fact in passing.

GOLD. Chemical Properties of.—Gold melts at the temperature of 12 of the scale of Wedgewood; and what is very remarkable is, that it is more difficult of fusion in the state of filings and grains, than in larger masses; and that the small fragments, even after they are fused, remain in separate globules; and in order to make them run into one mass, a little nitre or borax is thrown into the crucible. Gold, which has only been subjected to a degree of heat barely necessary for its fusion, is brittle after cooling. To preserve its ductility, which, as will be seen farther on, is one of the more important mechanical properties of gold, the temperature must be raised much higher. It is brittle also when it is too suddenly cooled after fusion. By an increase of temperature while the gold is in fusion, it becomes convex on the surface, and when it cools, it sinks, circumstances which are ascribed to the expansion and contraction of the metal. When it is gradually and slowly cooled, it crystallizes in the form of quadrangular pyramids, or regular octahedrons. If the heat be continued while it is in perfect fusion, it seems to be thrown into a kind of ebullition. This circumstance was noticed by Homberg and Macquer, as well in the application of the burning-glasses, as when a small globule of the metal was acted on by the blow-pipe. Macquer affords that it rote in vapour to the height of five or six inches, and attached itself to the surface of a silver plate, which it completely gilded.

The strongest heat of a furnace, which has been applied to gold in fusion, has been found incapable of producing the smallest change or the least tendency to oxidation; but, by the action of a very powerful burning-glasses invented by Tichirnhausen, and which has been described under the article Burning-glasses, Homberg found that gold, placed in its focus, not only rote in vapour, but that it was covered with a violet-coloured vitreous oxyd. The experiment was frequently repeated, so as to ascertain the fact fully completely. The same thing has been done by means of the electric discharge, by which gold-leaf, placed between two cards, has been converted into a violet-coloured powder. These influences of real oxidation were, at first, regarded, by some who witnessed the experiments, as merely minute mechanical divisions of the metal, but this apparent objection has been removed by the experiments of Van Marum on the combustibility of gold by means of the large electrical machine at Haerlem. A strong electrical shock was passed through a golden wire suspended in the air. It kindled, burned with a perceptible green flame, and was reduced to fine powder, which was dissipated in the air. A similar oxidation has been observed to take place on the gilding in the inside of houses,
house; or on the furniture which has been exposed to lightning. The purple oxyd of gold, thus obtained, contains five or six per cent. of oxygen. By precipitation from some of its saline combinations, a yellow oxyd has been obtained, in which the proportion of oxygen amounts to ten per cent. The oxyd in both instances may be decomposed, and the oxygen completely expelled, by an elevation of temperature not much superior to that of ignition.

The attraction of gold to oxygen is so weak, that it is scarcely affected by the greater number of acids. It was formerly supposed to be perfectly insoluble in the nitrous and nitro-muriatic acids, which in general part with oxygen with so much facility, and when gold leaf is put into the acid gold, it seems after no change, but when nitric or nitrous acid is boiled on gold, it is capable of dissolving a small portion of it. The quantity dissolved is, however, so inconsiderable, and depends on so many conditions, which it is needless to enumerate, that the accuracy of the processes of assaying can scarcely be affected by it.

When gold is dissolved in the nitro-muriatic acid, or in a mixture of equal parts of nitric and muriatic acids, an effervescence takes place, and the solution becomes a yellow colour. In this process the nitric acid is decomposed, its oxygen combines with the gold, and the oxyd, as it is formed, is dissolved in the muriatic acid. By adding lime-water a precipitate is formed, which is the yellow oxyd of gold, confluent of from eight to ten parts of oxygen in the hundred. There is no action between gold and azote, hydrogen, carbon, or sulphur: but the oxyds of gold are readily decomposed by hydrogen, as will be soon seen.

Phosphorus combines with gold by heating together in a crucible a mixture of one part of gold in filings, with two parts of phosphoric glafs, and an eighth part of charcoal. Great part of the phosphorus is separated from the acid, and driven off, but there remains a small quantity united with the gold, forming a phosphuret of gold. It may be done also by adding phosphorus to gold in a red heat in a crucible. It is, in this state, pale coloured, granulated, brittle, and a little more fusible. The proportion of phosphorus is not more than one part in twenty-four; and the fusiblity may be decomposed by being kept in fusion; the phosphorus is driven off in the state of vapour, and inflamed. Bergman has arranged the affinities of gold and its oxyd in the following order:

<table>
<thead>
<tr>
<th>Gold</th>
<th>Oxyd of Gold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>Muriatic-acid</td>
</tr>
<tr>
<td>Copper</td>
<td>Nitric</td>
</tr>
<tr>
<td>Silver</td>
<td>Sulphuric</td>
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<tr>
<td>Lead</td>
<td>Arsenic</td>
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<tr>
<td>Bismuth</td>
<td>Phosphoric</td>
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<tr>
<td>Tin</td>
<td>Fluoric</td>
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<tr>
<td>Antimony</td>
<td>Tartaric</td>
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| Iron | Salts of Gold.—These are the nitrate and muriate.

1. Nitrate of Gold. When concentrated nitric acid is several times successively poured upon gold, boiled and distilled to dryness, the gold is dissolved, and the solution assumes a yellowish colour. This solution is more readily effected in proportion to the quantity of gas or nitrous gas which the acid contains. Gold leaf, according to Fourcroy, is dissolved in nitric acid, impregnated with nitrous oxyd, and he supposes that it is owing to the nitrous oxyd that the gold is oxidized, this oxyd being so much more easily decomposed than the nitric acid. The acid which, at first, is deprived of its colour by the oxidation of the gold, as this oxyd is dissolved, assumes an orange-yellow colour, holding in solution the nitrate of gold with an excess of acid. The nitrate cannot be obtained in crystals, and it is decomposed by heat or by being exposed to the light of the sun; it is also decomposed by the alkalies, or by introducing a plate of tin or silver into the solution, and the purple oxyd is precipitated in the form of powder; and likewise by muriatic acid, which at the instant of combination converts the orange-colour to a pale yellow.

2. Muriate of Gold—Muriatic acid of itself has no action on gold, or on its purple oxyd, but gold is immediately oxidized and then dissolved in oxymuriatic acid; or if nitric acid be added to the muriate in certain proportions, the solution of gold in the mixture is readily effected; hence the oxymuriatic acid was distinguished by the name of "aqua regia," because it dissolved gold, which was regarded by the alchemists as the king of metals. The nature of the chemical action is thus explained. Gold is oxidized with great difficulty, but it is effected by oxymuriatic acid, which readily parts with its oxygen, or by the addition of the nitrous to the muriatic, the former of which is decomposed, giving out its oxygen to the gold, which being now oxidized is dissolved in the muriatic acid, forming with it a muriate of gold.

This solution of the muriate of gold is of a deep yellow colour, extremely acid and caustic; has an alranging metallic taint, and stains the skin of a deep purple colour, which becomes darker by exposure to the air and light. It produces a similar effect on all vegetable and animal matters, and on marble and siliceous stones. By evaporating the solution to one half, nitric acid is diffused, and crystals are obtained. These assume a red colour by the action of strong light. They attract moisture from the air, and spontaneously become liquid. When oxymuriatic acid is used, the oxygen of this acid being retained even by a weaker affinity than the nitric acid, the gold attracts it, and combines with the muriatic acid. In this case the solution is slow, and but a very small quantity of gold can be dissolved, partly from the oxymuriatic acid not being in a very concentrated state, and partly, it is supposed, from the quantity of oxygen present not being such as to form a sufficient quantity of oxyd to saturate the acid. It ought, however, to be observed, that if the late discoveries of professor Davy be established, which make the oxymuriatic acid a simple substance, and even possessing no oxygen whatever, then a new theory must be introduced to account for the facts above stated. In oxymuriatic gas, gold-leaf is instantly fused with inflammation, and diffused.

Gold cannot be dissolved by the other acids when in its metallic state, but its oxyd may be combined with them, and a number of the salts of gold be formed. The sulphate and nitrate also, as we have seen, do not crystallize; the phosphate of gold may be fused, and in this state it forms a fine red glafs. We shall now briefly notice some of the properties of the muriate of gold. In connection with this subjedt, we must not omit the experiments of Mrs. Fullam, which she announced in an "Essai on Combustion," with a view to a new art of dyeing and painting, &c. in the year 1794, and which were, at that period, expected to lead to some important practical results.

The muriate of gold is very soluble in water, and is decomposed in hydrogen gas. If a piece of silk be moistened
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with a solution of muriate of gold, the salt is decomposed, and the gold, reduced to the metallic state, attaches itself to the film. It is decomposed also by phosphorus. If a fiek of phosphorus be introduced into a saturated solution of muriate of gold, the salt is decomposed, and the gold, being reduced to the metallic state, forms a cylindrical covering to the phosphorus, which may be separated by diluting the latter in hot water. A similar effect is produced by burning sulphur, by sulphurated and phosphorated hydrogen gases, and by sulphuric acid. If a solution of muriate of gold be cautiously added to sulphurous acid, a fine pellicle of gold appears on the surface, which is instantly precipitated in the form of small grains. These, and many other experiments equally curious and interesting, were first described by the lady above-mentioned, and the rationale of the subject is thus explained. All the substances which have been enumerated have a stronger affinity for oxygen than gold, so that the oxyd of gold, in combination with the acid, is decomposed; the oxygen combining with the hydrogen, and forming water, or with the phosphorus or sulphur, and forming sulphuric or phosphoric acid.

"The muriate of gold is soluble in ether, and forms with it a solution of a golden yellow colour, which floats on the top of the fluid. By the addition of ether to a solution of gold, and agitating the mixture, as soon as it is left at rest, the two liquids separate, the ether rises to the top, and assumes a yellow colour, while the nitro-muriatic acid remains below and becomes white. By a process of this kind a tincture of gold was prepared, called "potable gold." The solution of gold in ether is not permanent: it is quickly reduced to the metallic state, and is sometimes found crystallized on the surface. The etherial solution is used by Mr. Stodart for defending lances, and other surgical instruments, from injury by a moist atmosphere.

The muriate of gold is decomposed by all the alkalis and earths, and is reduced to the state of yellow oxyd. Most of the metals decompose the muriate of gold: copper, iron, zinc throw down the gold in its metallic state: other metals, as silver or lead, in the state of purple oxyd.

The precipitate obtained by means of tin is valued for the beauty of the colour which it gives to glafs and enamels. This preparation is known to artists by the name of the "Purple powder of Casius," and it may be obtained by various processes. That which is commonly referred to, is to diffuse pure gold in a nitro-muriatic acid, which is composed of three parts of nitric and one of muriatic acid. A solution of tin is to be prepared by diffusing the metal in small portions at a time, in an acid containing two parts of nitric and one of muriatic acid, previously diluted with an equal weight of water. This solution, after it is saturated, is largely diluted, perhaps with a hundred parts of distilled water: to this the solution of gold equal in quantity to half the quantity of solution of tin, is added, and the precipitate is obtained after it is allowed to infuse, which is to be washed and dried. This is the only known preparation capable of giving a red colour to glafs: and if the experiment be performed with accuracy and judgment, the glafs so treated serve as a capital imitation of the ruby. The process is, however, attended with considerable difficulty, owing to the colour of the precipitate being various, from circumstances not easily discovered. According to Pelletier, it is a compound of oxyds of tin and gold; and its formation is owing to the strong attraction of the tin for the oxygen, with which it is diffused to combine in large quantities. When the solutions, above described, are mixed, the oxyd of tin, which is nearly at the minimum of oxydizement, at-tracts part of the oxygen of the oxyd of gold; the two oxyds thus brought to states of oxydizement, different from those in which they existed in the separate solutions, and probably likewise exerting mutual affinities, are no longer soluble, and are precipitated in combination. Muriate of gold is decomposed by some other metal salts, in consequence of similar actions; the oxygen of the oxyd of gold being attracted by the oxyd of the other metal, which hence passes to a higher state of oxydizement. Those which have a strong tendency to exist in such a state, are capable even of completely de-oxydizing the oxyd of gold. Example.—If a solution of the green sulphate of iron be added to the solution of muriate of gold, the gold is precipitated in very minute particles in the metallic state, while the iron passes to the state of a red sulphate. A solution of muriate of gold, when concentrated by evaporation, yields beautiful yellow crystals, not unlike topazes.

Gold, as we have seen, does not combine with sulphur by fusion, and on this is founded a method of freeing it from silver or other metals, the alloy being fused with sulphur, the silver, &c., unite with the sulphur, leaving the gold separate. But gold and sulphur may be united by the medium of an alkali. Example.—Let a sulphuret of potash be fused with one-eighth of its weight of gold-leaf, and the combination is even soluble in water, the solution being of a green colour.

Alloys of Gold.—Gold forms alloys with the greater number of the metals, which produce on the metal to be alloyed a very particular change in its properties. An extensive and accurate series of experiments on these alloys was made by Mr. Hatchet, with the view of determining some important and interesting facts relating to the use of gold as a coin. Of these we shall give a brief abstract, referring our readers for a more particular account to the Transactions of the Royal Society for the year 1803.

The chief enquiry of Mr. Hatchet, as connected with the alloys of gold, was, whether soft and ductile gold, or gold made as hard as is compatible with the process of coining, fuses more by wear. His experiments were intended to examine the effects which various metals produce upon gold, when combined with it in given proportions, beginning with 1/6th, which is the standard proportion of alloy, and gradually decreasing to 1/35th part of metals. The results drawn from the trials were, that fine gold, alloyed with silver, with copper, and with tin, did not suffer any loss during the experiment. The gold alloyed with lead only lost three grains, chiefly by vitrification; with iron it lost 12 grains, which formed socian; with bismuth it lost 12 grains, chiefly by vitrification; with zinc it lost a pennyweight by volatilization; and with arsenic, it not only lost the whole quantity of alloy, but also two grains of the gold which were carried off in consequence of the rapid volatilization of the arsenic. Hence it was inferred that only two metals are proper for the alloy of gold coin, namely, silver and copper; as all the others either considerably alter the colour, or diminish the ductility of gold. In respect to the latter quality, the different alloys employed in this series of experiments appear to affect gold nearly in the following decreasing order:—1. Bismuth. 2. Lead. 3. Antimony. 4. Arsenic. 5. Zinc. 6. Copper. 7. Marganese. 8. Nickel. 9. Tin. 10. Iron. 11. Platinum. 12. Copper, and 13. Silver. The three first have nearly the same effect on gold, and bismuth is found to render gold brittle when the proportion of that metal is to gold only as 1 to 1520; even the vapour arising from bismuth, lead, and antimony in fusion, produces these changes.

2
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The alloy with platina is of a yellowish white colour, very ductile, and of a considerable specific gravity. The alloy with silver in the standard proportion, or 1 to 12, approaches, as we have seen above, the nearest to the ductility of fine gold of any alloy, and its specific gravity differs but little from the mean specific gravity of the two metals. When the silver amounts to 1/12, the colour of the alloy approaches to green, and forms the green gold of the goldsmiths. In combination with copper, gold has its colour rather heightened than impaired; its hardness is increased and its ductility very little lessened, when the standard proportion of 1 part in 12 is not exceeded. This alloy of 22 carats fine is generally used, when gold is fabricated into plate or ornaments, and likewise forms the gold coin of the country.

With quicksilver, gold unites with great facility, making with it an amalgam which will be described hereafter. The alloy with iron is much harder than gold, very ductile and malleable; but the colour is debased to a dullish grey, inclining to white. Tin was formerly regarded as the metal which rendered the alloy with gold the most brittle of all the alloys, but the experiments of Mr. Bingley and Mr. Hatchet have shown that this notion is to a certain extent erroneous, and that the effects produced by the mixture of tin with gold, ought probably to be ascribed to other metals, with which the tin was contaminated, such as bismuth, antimony, lead, and zinc. The alloy, consisting of equal parts of zinc and gold, is very hard and infusible to a fine polish, and not being subject to much alteration from the air, it is recommended for the fabrication of the mirrors of telescopes. The alloy of gold with silver, in which there is only 1/5th part of silver, changes the colour of the gold very sensibly; and the alloy is employed for folding gold, being more fusible than this metal.

Physiological properties of Gold. aurum, a yellow metal, heavy, pure, ductile, malleable, and thinning; and on those accounts, the most valuable of all metals. In fusibility it ranks between silver and copper; it is not oxydizable by fusion in atmospheric air; nor is it acted upon by any of the acids, except the oxymuriatic and nitro-muriatic.

The yellow colour of gold is rendered paler by fusion with borax; but this may be prevented or corrected by fusion with nitre, or sal ammoniac. The colour of gold is heightened by an alloy of copper, and this property of copper has given rise to fundry processes for exalting the colour of this noble metal. Other metals render it paler. The alchemists call gold, fol, the sun; to denote its pre-eminence over the other metals, which are called by the names of the planets. Its symbol, or character, is O; which, in their hieroglyphical way of writing, denotes perfection, simplicity, solidity, &c.

The weight of gold is that of water, according to some statements, as 19,637 to 1000. Fine gold, impered in water, weighs nearly one nineteenth part less than in air, and consequently it is used in nineteen times heavier than its own volume of water. However, the specific gravity of gold, or its comparative weight with an equal volume of water, has been variously aligned: some have made it 19,637, others 19,642, and in the Swedish Trans actions it is made no less than 20,000; that of water being 1000. Others again have made it as low as 18.75. But from the experiments of Mr. Ellicot, it does not appear to have exceeded 19,207; and from those of Dr. Lewis, on the purest gold, well hammerd, its gravity is flatted between 19,300 and 19,400. In all experiments of this kind, the result should be specified with an account of the sensibility of the balance, and the quality and warmth of the water. An increase of heat rarefying water more than it does gold, the gold must turn out proportionally heavier than an equal volume of the expanded fluid; and this difference is more considerable than it has generally been supposed. From freezing to boiling water, or by an augmentation of heat equivalent to 180° of Fahrenheit's thermometer, Dr. Lewis found that a rod of gold was lengthened about one part in 700, and confequently its volume increased about one part in 233, while the volume of water is increased one twenty-sixth or more; hence it appears, that by an augmentation of 40° of the thermometer, or from a little above freezing to the summer heat, the volume of gold, if its expansion be uniform, is increased one part in 1048, and that of water one in 117; and the gravity of gold, weighed in the water so warmed and expanded, would be greater than when the gold and water are 40° colder, in the proportion of about 19,325 to 19,400: and this calculation gives a difference, in the gravity, of 0.034 for every 10° of the thermometer; but some trials seemed to make it greater. It has been imagined, that the comparative gravity of gold to brass's weights, which are more than double in volume to an equal weight of gold, must be so far influence by the variable gravity of the atmosphere, that there must be an advantage in buying gold by weight when the air is lightest. But Dr. Lewis observes, that this difference appears too inconsiderable to be regarded in a commercial view. For the loss of weight of the two metals in the air being as much kfs than their lots in water, as air is lighter than water; and air, if we admit the accuracy of the conclusion deduced from an experiment of Mr. Hawkchi, being in its lightest state about 1,048, and in its heaviest state about 1,000, the gravity of gold will be about 40°, or one grain in about 302 ounces; which is a difference too minute to be sensible in the nicest balance. If the mean gravity of gold be reckoned 19,320, as a cubic inch of water weighs about 254 grains, a cubic inch of gold will confequently weigh about 4,902, or 10 ounces, 102 grains. The pound weight, or twelve ounces Troy, of gold, is divided into twenty-four carats. Dr. Lewis states the specific gravity of fine gold at 53° Fahrenheit, to be 19,376. According to Brillon the specific gravity of fine gold in ingot is 19,358, and when hammered 19,361. The specific gravity of gold made standard by British copper, was found by Mr. Hatchet (see Phil. Trans. for 1823) to be 17,281, when cast in an iron mould; but when the same mould was cast in sand, it was only 16,904. (See Specific Gravity.) The softness of gold, for it is nearly as soft as tin, and its toughness, adapt it for receiving the impressions of dies, and of course to be reduced to the state of coin, and for various other purposes in the arts. It is but lightly elastic and fronsorous. With regard to tenacity, it is inferior to iron, copper, platina, and silver; and therefore the assertions of former chemists and philosophers have been contradicted by later experiments, for gold has been usually represented as the most tenacious as well as the most ductile of all metals. Its malleability and ductility are sufficiently evinced by the Gold-lea and Gold-wire, which see. See also Ductility.

The value of gold to that of silver, was anciently only as twelve to one. Indeed, this proportion varies as gold is more or less plentiful: for Suetonius relates, that Cesar brought from a quantity of gold from Italy, that the pound of gold was only worth seven pounds and a half of silver. In our coinage, the value of fine gold to fine silver is nearly as 15:1. (See Coin and Standard.) Sir Isaac Newton observes, in a representation to the lords of the treasury.
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Gold may be recovered from wood, gilt on a water size, by steeping it for a quarter of an hour in a quantity of very hot water, sufficient to cover it; then scrub the wood in a little warm water, with short flint bristle brushes of different sizes; boil the whole mixture of water, size, gold, &c. to dryness; make the dry matter red-hot in a crucible to burn off the size, and grind the remainder with mercury. The gold will be more easily laid hold of by the mercury, by the addition of some clean sand.

GOLD. Alchemical History of. See Philosopher's Stone, and Transmutation.

GOLD. Amalgam of; is a preparation of gold much used by the gilders (see Gilding); and it is made by heating some pure quicksilver in a clean crucible, and adding to it, when it is nearly boiling, about a sixtieth of its weight of fine gold in thin plates that are hot; after this mixture has been kept hot for a few minutes, it becomes an homogeneous substance, and when cold, it is put into a piece of soft leather, and which is graduated to the fluid part of the amalgam, confining almost wholly of mercury, is forced through the pores of the leather; while the gold, combined with about twice its weight of mercury, will remain in the state of a yellow silvery mass, of the confecion of soft butter; when this mass has been bruised in a mortar, or shaken in a phial, with repeated portions of salt and water, till the water receives no founts from it, it is fit for use, and may be preferred for any time in a corked phial. For the purposes of gilding it is of great importance, that this amalgam should be formed of pure materials, as any portion of lead or bismuth would deteriorate the colour of the gold, and tarnish it with black specks. The mercury should therefore be previously distilled from the red precipitate (nitrus red oxide of mercury), either alone or mixed with a little charcoal powder. See Amalgam and Mercury.

GOLD-leafing, and GOLD-leather's skin. See Gold-leaf.

GOLD. Burnished, is that which is polished with afiled instrument, called a burnisher, if it be wrought gold, or gilding on metal; or with a wolf's tooth, if it be gilding in water. See Gilding.

GOLD Chain. See Chain.

GOLD Coin, or species of gold. See Coin and Coinage.

GOLD Colour on Cloths and China. See Gems, Glass, Gilding, and Porcelain.

GOLD-coloured Glazing. See Glazing.

GOLD-coloured Metal is produced by melting zinc with copper. According to the purity of the zinc and copper, the proportions in which they are mixed, and the intimacy of their union, the compound metal proves more or less malleable, and approaches more or less to the colour of gold. Some direct the zinc to be taken only in a fifth or sixth part of the weight of the copper, and others in an equal weight or more. Dr. Lewis observes, from the result of many experiments, that both with the smallest and largest of these quantities of zinc, the metal proves more like gold than with the intermediate proportions.

The colour of these compounds is improved by a small mixture of some other metallic bodies. Crider recommends the addition of a small quantity of pure tin to copper, melted with a fourth or sixth part of zinc, which forms a compound metal, that acquires, on being well cleansed, and laid in the air for some days, a superficial colour of fine gold. Geoffroy says that iron has the like effect: with the proportions of ten parts of zinc, eight of copper, and one of iron-fillings, he produced a metal of a fine smooth grain, compact, hard, and bright, and of a beautiful gold colour. By making the copper first into braids, and then melting it with a suitable quantity of zinc, a metal may be obtained of a

There are various methods of separating gold from gilt works: it may be separated from the surface of silver, either by spreading over the gilt silver a pail made of powdered kil ammoniac moistened with aquafortis, and heating it till the matter fumes, and is nearly dry; throw it into water, and the gold will easily come off by rubbing it with a soft brush; or, by putting the gilt silver into common aqua regia, nearly boiling, and turning the metal frequently, till it becomes all over black; then wash it with water, and rub it with the soft brush, which will disengage the gold left by the aqua regia. See Gilding.

Gold may be separated from gilt copper, by applying a solution of borax to the gilt parts with a pencil, and sprinkling over the place thus moistened a little powdered sulphur; when the piece is made red-hot and quenched in water, the gold may be wiped off with a brush.
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perior quality to that produced either by melting the copper and zinc, or by impregnating the copper with zinc, by cementation and fusion with calamine; which is a method sometimes practiced. A very ingenious artifl, says Dr. Lewis, who now prepares a gold-coloured metal in great perfection, has a fine kind of brass made on purpose for this use. The union of the copper and zinc in fusion, succeeds best and with least loss of the zinc, according to Dr. Lewis, by using a mixture of black flux and borax, or a composition of twelve parts of green glass powdered, six parts of potash, two of borax, and one of powdered charcoal; when this flux is fused in the crucible, the copper and zinc are dropped into it; and when they appear perfectly melted, they are to be well stirred together with an iron rod, and expeditiously poured out. The same flux will serve for melting several fresh quantities of the metal. Dr. Hooke gives the following receipt for making a gold-coloured metal: eight parts of distilled verdigris, i.e. of verdigris purified by solution in distilled vinegar and crystallization, and four parts of Alexandrian tutton, with two of nitre, and one of borax, are directed to be mixed with oil to the confidence of pap; then melted in a crucible, and poured into a flat mould first well warmed. A composition of this kind is called aurum jophillicum.

The following method is recommended by Homberg for giving a gold colour to copper, without the addition of zinc; make an amalgam of one part pure copper, and three parts quicksilver; boil this in water for two hours, then distil off the quicksilver in a retort, and colohate it once; take out the copper and fuse it, and it will be found of a beautiful gold colour, more ductile than common copper, and extremely well fitted for watch-work, gilding, and the finer machines and utensils. The celebrated Mr. Pott affirms that a gold-coloured metal may be made from a mixture of copper and tin, and directs it to be compounded in the following manner: Take one half ounce of tin, and four half ounces of copper; melt them well together in a clofe luted crucible, with a strong fire; or take one half ounce of the pure tin cut in pieces, and sixteen half ounces of pure copper beaten into thin plates; lay the tin between the copper-plates, lute the crucible close, and melt with a strong fire. See Prince's Metal and Tombac.

Silver is tarnished superficially, by certain vapours, as that of putrefied urine, to a colour so like that of gold, that several edicts have been issued in France to prevent frauds of this kind with regard to wire and laces.

Gold-coloured Pigments. See Pigments.

Gold-coloured Varnish. See Lacquer.


Gold, Dutch, is a kind of leaf used in gilding, &c. which is copper gilt, or brass beaten into leaves like the genuine gold-leaf. It is said to be made from copperplates, by cementation with calamine, without subsequent fusion. The thickness, compared with that of leaf-gold, is as nineteen to four, and under equal surfaces it is considerably more than twice as heavy as the gold.

Gold, Fencing of. See Farting.

Gold, Fine or Pure, is that purged by the fire of all its impurities, and all alloy. The Latins call it aurum purum, aurum primum, aurum obvixum, aurum clemum.

The moderns frequently call it gold of twenty-four carats; but, in reality, there is no such thing as gold so very pure; and there is always wanting at least a quarter of a carat. Gold of twenty-two carats has one part of silver, and another of copper: that of twenty-three carats has half a part, i.e. half a twenty-fourth of each.

Boutier gives that the electrum of the ancients was gold of nineteen carats; or four parts gold, and a fifth silver.

From an ordinance of king John ofrance, it appears that the gold then struck at Paris was of nineteen carats one-fifth; and yet it is added that it was the bolt and finest gold then known on earth. See STANDARD.

Gold, Fulminating, aurum fulminans, a precipitate of gold from its nitro-murate solution by ammonia, which possesses a remarkable explosive property. See Aurum.

It is prepared by diluting a solution of muriated gold with six or eight times its bulk of distilled water, adding drop by drop liquid ammonia, till the precipitation ceases; then let the yellow powder thus obtained be separated by a filter, well washed in hot water, and afterwards dried. The fulminating gold, thus procured, will exceed the weight of the original gold by about 33 parts in 100. If a small quantity, e.g. half a grain, of this powder be held over a candle, in a spoon or on the blade of a knife, it preferably explodes with a very loud report. This powder should be very cautiously used; the temperature requisite for its explosion is flated at above 250 of Fahrenheit. Before it explodes, its yellow colour changes to black, and at the moment of its decomposition an instantaneous flash is observed. The principal energy in explosion is directed downwards, insomuch that two or three grains of it exploded on a moderately thick florin of copper will burk a hole in it. This falt is decomposed by an electrical shock, but it cannot be ignited by a spark from electricity or from flint and steel. It will vehemently explode by sudden friction, and therefore, in order to avoid dangerous accidents of this kind, it should never be kept in a ground-stoppered bottle. The facility of its explosion is very much increased by drying; so that if it be heated till it becomes black, and is immediately removed from the fire, it will frequently go off by a mere touch. If the fulminating gold be mixed with four or five times its weight of chalk, or pulpitate of potash, or with any pulverised sulphur, it becomes decomposable at a moderate temperature, and exploded gradually to a low heat, it will be quickly decomposed, leaving merely the purple oxyd of gold. The same effect may be produced by very cautiously heating the fulminating gold without any addition, removing it from the fire when it has changed its colour, and when cold heating it again, and proceeding in this way till the powder becomes purple, in which state it will have entirely lost its explosive faculty. A similar change occurs by melting sulphur at the lowest possible heat, and dropping in the fulminating gold by half a grain at a time, well mixing it; the sulphur may then be burnt off without danger, and minute grains of metallic gold will be left behind. "The true theory of the decomposition of fulminating gold was partially discovered by Bergman, and has since been fully illustrated by Berthollet. The former of these able chemists showed that this falt when decomposed in clofe vessels was reduced to gold, partly in the metallic state, partly in that of purple oxyd, and at the same time a gas was extricated in bulk, about a thousand times as great as that of the original fulminating falt, and which extinguished flame and animal life, was not absorbed by water, and gave no precipitate with lime-water. Berthollet, by decomposing the same substance in a copper tube, connected with a jar inverted in mercury, obtained azotic gas and a few drops of water, and the gold was reduced to the metallic appearance. Now as ammonia is composed of hydrogen and azot, and as the affinity of gold for oxygen is very slight, it is manifest that the decomposition and explosion, under the circumstances already mentioned, are occasioned by the oxygen of the 3H2 gold.
GOLD.

gold and the hydrogen of the ammonia combining to form water, and to the liberation of the azot and its sudden af-
sumption of the gaseous state.” Akin’s Dict.

Gold, Leaf, or beaten gold, is gold beaten with a hammer
into exceedingly thin leaves. It is astonishing to con-
sider the fragments to which a body of gold is thus reduced. In
an experiment of Reaumur’s, forty-two square inches and
three tenths of gold-leaf weighed one grain Troy; and Mr. Boyle found that fifty and seven tenths weighed but a
grain. As a cubic inch of gold weighs 1442 grains, the
thickness of the gold-leaf examined by the one was the
277355th, and of that by the other only the 248532nd
part of an inch. See Ductility of Gold.

This gold is beat on a smooth block of black marble,
from two hundred to six hundred pounds in weight, and
about nine inches square on the upper surface, fitted into
the middle of a wooden frame, about two feet square, so
as that the surface of the marble and frame form one even
plane. Three of the dies are furnished with a high ledge,
and the front, which is open, has a leather flap fastened to
it, which the gold beaters use as an apron, for preferring
the fragments of gold that fall off. Three hammers are
employed in this business, having two round and some-
what convex faces: the first, called the cutch hammer, is
about four inches in diameter, and weighs fifteen or sixteen
pounds: the second, called the shoading hammer, weighs
about twelve, pounds, and is of the same diameter: the
third, called the gold or finishing hammer, weighs ten
or eleven pounds, and is nearly of the same width. The
French use four hammers, differing both in size and shape
from those of our workmen.

The gold beaters also use three kinds of animal mem-
branes, some of which are laid between the leaves to pre-
vent their uniting together, and others over them to defend
them from injury by the action of the hammer. For
the outside cover, they use common parchment made of sheep
skin; for interlaying with the gold, first, the smoothest and
closest vellum made of calves skin; and afterwards, the
much finer skins of ox-gut, stripped off from the large straight
gut first open, prepared on purpose for this use, and hence
called gold-beater’s skin. The general process of their pre-
paration, is laid to consist in applying one upon another, by
the smooth sides, in a moist state, in which they readily
cohere and unite inseparably, stretching them on a frame,
and carefully ferappling off the flat and rough matter, so as
to leave only the fine exterior membrane of the gut; beat-
ing them between double leaves of paper, to force out the
remaining uneftuivity; moistening them once or twice with
an infusion of warm spices, and bailing, drying and prefling
them. It is laid, that some calcined gypsum, or platter
of Paris, is rubbed with a hare’s foot, both on the vellum,
and ox-gut skins, which fill up their pores, and prevent
the gold leaf from flicking. These skins, after twenty or
eighty repetitions, become unfit for use; but their virtue
may be restored by interlaying them with leaves of paper
moistened with vinegar or white wine, beating them for a
whole day, and afterwards rubbing them over with plater
of Paris; and even holes in them may be repaired by the
dextrous application of fresh skins.

Gold, the manner of preparing and beating. They first
make a quantity of the purest gold in a black-lead crucible,
with some borax, in a wind furnace, and pour it into an
iron ingot mould, six or eight inches long, and 4 of an inch
wide, previously prepared and heated; the bar of gold is
made red-hot and forged on an anvil into a long plate,
which is further extended, by being passed repeatedly be-
tween polished steel rollers, till it becomes a ribband, as
thin as paper. This ribband is divided by compasses, and
cut with thins into equal pieces, which are forged on an
anvil till they are an inch square, and afterwards well an-
nealed. Two ounces of gold, which is the quantity melt-
at a time, make one hundred and fifty of these squares,
so that each of them weighs six grains and two fifths;
and as 4902 grains of gold make a cubic inch, the thick-
ness of the square pieces is about the 766th part of an
inch. All these squares are interlaid with leaves or vel-
lum, three or four inches square; one leaf being laid be-
tween every two of them, and about twenty more of the
leaves are laid on the outsides; over these is drawn a
parchment caine open at both ends, and over this another,
in a contrary direction, so that the vellum and gold leaves
are kept tight and close. The whole is then beaten with
the heaviest hammer, till the gold is stretched to the ex-
tent of the vellum; the pieces taken out of this caine or
mould, are cut in four with a flex knife; and the six
hundred pieces thus produced are interlaid, is the fame
manner, with pieces of the ox-gut skins, five inches square.
The beating is repeated with a lighter hammer, till the
golden plates have acquired the extent of the skin;
when they are divided into four, by a piece of cane cut
to an edge. The whole number of leaves is then divided
into four parcels, which are interlaid, as before, and
beaten separately, till they are stretched for the third
time to the size of the skins. The French repeat the divi-
sion and beating once more. After the last beating, the leaves
are taken up by the end of a cane instrument, and being
thrown flat on a leathern cushion, are cut to a size, one
by one, with a square frame of cane made of a proper
harpanet, or with a frame of wood edged with cane. They
are then fitted into books of twenty-five leaves each, the
paper which is well smoothed, and rubbed with red bole
to prevent their flicking to it. The size of the French gold
leaves is from somewhat less than three inches to 3 2
square; that of ours from three inches to 3. We shall here obser
that the gold used for the above purpose is never pure,
because pure gold is too ductile to be worked between the
gold-beater’s skins. The newel skins will work the finest gold,
and make the thinnest leaf, because they are the smoothest. Old
skins, being rough or foul, require coarser gold. The
finest gold for this purpose has three grains of alloy in
the ounce, and the coarsest 12 grains. In general the alloy is
six grains, or one eighth part. The alloy of leaf-gold
is silver, or copper, or both, and the colour is produced of
various tints accordingly. Two ounces and two penny-
weights of gold are delivered by the maker to the work-
man, who, if very skilful, returns 2200 leaves, or 80 books,
of gold, together with one ounce and six pennyweights of
waite cuttings. Hence one book weighs 4.8 grains; and
as the leaves measure 3.3 inches in the side, the thick-
ness of the leaf is one two hundred and eighty-two thou-
sandth part of an inch.

The French prepare what is called green gold-leave, from
a composition of one part of copper and two of silver,
with eighty of gold; but Dr. Lewis observes, that such
an admixture gives no greenesse to gold, and that this kind
of leaf is made from the same fine gold as the highest
gold-coloured fort, the greenish hue being a superficial tinct
given to the gold in some part of the procces; this leaf
is chiefly used for the gilding of books. A kind of leaf,
called party-gold, is formed by laying a thick leaf of silver,
and a thinner one of gold, flat on another; they are
then heated and preflled together, so as to unite and cohere:
and being beaten into fine leaves, as in the foregoing
procces, the gold, though only in quantity a fourth of
GOLD.

of that of the silver, extends over it and every where covers it.

GOLD. Million of, a phrase often used to signify a million of crowns.

GOLD Money. See Money and Coin.

GOLD, Malleable, is gold applied in pannels on proper ground, distributed into squares, lozenges, and other compartments: part of which is shadowed to raise or heighten the ref. See MOSAIC.

GOLD Plates for Enamelling are generally made of ducat gold, whose fineness is from 232 to 234 carats: and the finest gold is the best for this purpose, unless where some parts of the gold are left bare and unpolished, as in watch-cases, snuff-boxes, &c. for which purpose a mixture of alloy is necessary, and silver is preferred to copper, because the latter dispoyses the plates to tarnish, and turn green. See ENAMELLING.

GOLD Pottage, aurum pottage. See AURUM Pottage, and GOLD.

GOLD Powder, for the purposes of gilding, may be made by grinding gold leaf with honey, or thick gum-water, (see Shell-gold): by diffusing to drawers a solution of gold in aqua regia: by evaporating the mercury from an amalgam of gold, taking care well to stir the mass near the end of the process with a glass rod or tobacco pipe; or by precipitating gold from its solution in aqua regia by applying to it a solution of common green vitriol in water, or some copper, &c.

GOLD Precipitate with Tin, called also, from its supposed discoverer, caele Caffis, is prepared with great care both in dissolving the tin, and diluting the solution. For this purpose, a mixture of two parts of aquafortis, and one of spirit of salt, is supposed to be the best menstruam for the tin. Into this mixture some fine black tin, granulated, is to be set full, grain by grain, waiting till one grain is dissolved before another is dropped in, that the dissolution may go on slowly, without any heat or discharge of fumes. The gold is dissolved in common aqua regia; and a few drops of this solution being mixed with some ounces of pure water, as many drops of the solution of tin are added. If the mixture changes immediately to a clear bright purplish red colour, the due degree of dilution has been determined; if the colour appears dull, a greater quantity of water must be added for the rest of the solutions. After the mixture has deposited its red matter, and become clear, a little more of the tin solution is to be dropped in, for dissolving and precipitating any gold that may still remain in it: the liquor being then poured off, the precipitate is washed and dried. Lewis's Corn. Phil. Techn. p. 176. See Ruby.

GLASS.

GOLD, Queen. See Queen gold.

GOLD, Shell, is that used by the gilders and illuminers, and with which gold letters are written. It is made by grinding gold leaves, or gold beaten's fragments, with a little honey, and afterwards separating the honey from the powdered gold by means of water. When the honey is washed away, the gold may be put on paper, or kept in flasks; whence its name. When it is used, it is diluted with gum-water, or soap-fats. The German gold-powder, prepared from the Dutch gold leaf in the same manner, is generally used, and when it is well mixed with varnish, answers the end in Japanese' gilding, as well as the genuine. See GILDING.

GOLD-see for burnished gilding, is prepared of one pound and a half of tobacco-pipe clay, half an ounce of red chalk, a quarter of an ounce of black lead, forty drops of sweet oil, and three drams of pure tallow; grind the clay, chalk, and black-lead separately, very fine in water; then mix them together; add the oil and tallow, and grind the mixture to a fine consistence; or it may be more simply prepared by grinding together some strongly calcined red ochre with the thickest and oldest drying oil that can be procured; and, previously to use, mixing it with a little oil of turpentine for giving it a proper consistence. See Oil Gilding.

GOLD-see of Japanese may be made by pulverizing gum anis and aphanturum, of each one ounce; red-lead, litharge of gold, and umbre, of each one ounce and a half, mixing them with a pound of linseed oil, and boiling them, observing to stir them till the whole be incorporated, and appears, on growing cold, of the consistence of tar; strain the mixture through a flannel, and keep it stopped up in a bottle, for use. When it is used, it must be ground with as much vermilion as will give it an opaque body, and diluted with oil of turpentine, so that it may be worked freely with the pencil. A simple preparation consists of one pound of linseed oil, and four ounces of gum anis; powder the gum, and mix it gradually with the boiling oil; let it continue to boil, till it becomes of the consistence of tar; strain it through a coarse cloth, keep it and use it as the other.

GOLDsmith, or as some choose to express it, silver-smith, the artist who makes vessels, utensils, and ornaments in gold or silver. The goldsmiths' work is either performed in the mould, or beat out with the hammer or other engine. All works that have raised figures are cast in moulds, and afterwards polished and finished; plates or dishes of silver or gold are beat out from thin flat plates, and tankards and other vessels of that kind are formed of plates folded together, and their mouldings are beat, not cast. The bains of the goldsmith formerly required much more labour than it does at present, for they were obliged to hammer the metal from the ingot to the thinnest that it was to be, and are now invented flattening-mills, which reduce metal to the thinnest that is required, at a very small expense. The goldsmith is to make his own moulds, and for that reason ought to be a good designer, and have a taste in sculpture: he also ought to know enough of metallurgy to be able to assay mixed metals, and to mix the alloy.

The goldsmith in London employs several hands under him for the various articles of his trade. In this great city there are always hands that excel in every particular branch of the trade, and there is commonly employment enough for every one in his particular branch. The jeweller, the snuff-box and toy-maker, the silver turner, the gilder, the burnisher, the chaser, the refiner, and the gold-beater, are all employed by and under the goldsmith.


GOLD-Thread, or spun gold, is a flattened wire, wrapped or laid over a thread of yellow silk, by twisting it with a wheel and iron bobbins. By means of a curious but complex machinery, a number of threads is thus twisted at once by the turning of one wheel. The principal art consists in so regulating the motion, that the several circumvolutions of the flattened wire, on each thread, may just touch one another, and form, as it were, one continued covering. At Milan, it is said, they make a fort of flattened wire, gilt only on one side, which is wound upon the thread, so that only the gilt side appears. There is also a gilt copper wire, made in the same manner as the gilt silver, chiefly at Nuremberg: and the ordinances of France
France require it to be spun on flaxen or hempen threads. The Chinee, instead of flatted gilt wire, use strips of gilt paper, which they interweave in their fluffs, and twist upon silk threads.

**Gold, Tun of.** is a kind of money of account, formerly used by the Dutch, and in some countries, containing a hundred thousand florins. A hundred pounds of, or in, gold, is found to weigh two pounds ten ounces; the sum in silver weighs twenty-six pounds four ounces. Twenty-two pence in copper farthings and half-pence, weigh one pound avoidujs. A tun of gold, at 4l. the ounce, amounts to 96,000/. A tun of silver, at 5/. 2d. the ounce, to 6200/. A pound flering of gold to 48l. An ounce is worth 4l. The penny-weight 4s. One grain, 2d. A pound of flering silver amounts to 5l. 2d. An ounce is worth 5l. 2d. The penny-weight, 3d. and something more; one grain a half-penny. A pound of silver avoidujs comes to 3l. 5l. 3d. half-penny.

**Gold, Virgin.** is pure gold, just as it is taken out of the mines, before it has undergone any action or preparation of fire; whence the Greeks call it *ortygios.*

Such is the *expurgatus,* or gold-dust, and that got by boiling down in water; or by a mixture of niter and water in Chilli; it is added, that there are maufes or lumps of pure gold found in the mines, particularly those of Hungary. Accordingly, in the emperor's collection, are still preferred several plates of gold, said to have been thus found.

Virgin gold is sometimes very pale, and so soft, that it may be moulded into any figure with the hand; it even takes an impression from a seal, like the softest wax. To harden it, as also to heighten its colour, they mix emery with it.

**Gold, White.** See Platina.

**Gold Wire.** is a cylindrical ingot of silver, above an inch thick, two feet in length, and weighing about twenty pounds, superficially gilt, or covered with gold at the fire, and afterwards drawn successively through a great number of little round holes of a wire-drawing iron, each less than the other, till it be sometimes no bigger than a hair of the head. There is very little wire made entirely of gold, and this chiefly for one particular purpose, that of filigree work.

It is amazing to what degree of fineness the gold is here drawn; and yet it still keeps firm together, and never flew the least sign of the silver underneath it. The reader may see a computation hereof, as also a more particular account of the manner of proceeding, under the article Ductility of gold.

**Gold Wire flattened,** is the former wire flattened between two rollers of polished steel, to fit it to be spun in silk, or to be used flat as it is without spinning, in certain fluffs, laces, embroideries, &c.

**Manner of forming Gold Wire and Gold thread, both round and flat.** — The fist object, which is of the utmost consequence, is the choice of the purest gold; for on this chiefly depends the beauty and durability of the colour of the laces, broacades, and other commodities prepared from it. To a difference in this respect, the boasted superiority of the French lace to the generality of those made in England, till of late, has been wholly owing. With regard to the silver that forms the body of the wire, it is said that there is an advantage in its being alloyed. The French silver for gilding is said to be alloyed with five or six penny-weight, and ours with twelve penny-weight of copper, in the pound Troy. The gold is employed in thick leaves, which are applied all over the silver rod, and pressed down smooth with a feel burner. Several of these leaves are laid one another, as the gilding is required to be more or less thick. The smallest proportion allowed by act of parliament, is 100 grains of gold to a pound, or 5750 grains of silver. The largest proportion for the best double-gilt wire was formerly 120 grains to a pound; but the proportion of gold has been of late increased to about 120 grains. The first part of the drawing processes, as well as the preparation and gilding of the silver rod, is performed by the refiner, who uses plates of hardened steel, with a piece of tough iron welded on the back, to prevent the feel from breaking. The holes in these plates are conical, being larger in the back part than in the feel, that the rod may not be lacerated against the outer edge, and that they may contain bees-wax, which makes the rod pass more freely, and preserves the gold from being rubbed off. One end of the rod, made smaller than the feel, is pulled through a hole that will admit it, where the plate has been properly secured, and laid held by long pincers, called clamps, adapted to the purpose; to these pincers, which are so contrived, that the force which pulls them horizontally, serves at the same time to press them together, a rope is fastened by one end, and the other end goes round a capstan with crofs bars, which requires the strength of several men to turn it. The rod, thus drawn through, is well annealed; it is then passed through the next hole; and the annealing and drawing are repeated, till, being reduced to about the size of a large quill, it is delivered in coils to the wire-drawers. The remainder of the processes requires plates of a different quality, which are brought from Lyons in France, and are formed of a metallic mass, whose prevailing ingredient is iron: the holes are drilled in them here. These plates are of two forts; some of considerable thickness, for the wire in its larger state, and others about half as thick, for the finer wire. In the use of these plates, furnished with a variety of holes, the dexterity of the workman principally consists in adapting the hole to the wire; for this purpose he uses a brafs plate, called a fuse, on which is measured, by means of notches, like lips cut at one end, the increase which a certain length of wire should gain in passing through a fresh hole; and if the wire is found to stretch too much or too little, the hole is widened or contracted. Slits of different widths, in thick polished iron rings, serve also as gages for measuring the degree of fineness of the wire.

The wire-drawer's processes begin with annealing the large wire received from the refiner, which he does, by placing it, coiled up, on some lighted charcoal, in a cylindrical cavity, called the pit, under a chimney, and throwing more burning charcoal over it. When it is cooled by being quenched in water, one end is passed through the first hole in the thick plate, and fastened to an upright wooden cylinder fixed or eight inches in diameter; in the top of which are two staples, and through these is passed the long arm of a handle, by which the cylinder is turned on its axis by several men. By this process, called destaffing, the wire is frequently annealed and quenched, after passing through every hole, or every other hole, till it is brought to about the size of the small end of a tobacco pipe, and then cut into portions for the fine wire-drawer. In this last part of the wire-drawing processes, annealing is not necessary, but the wire is waxed at every hole. The contrivance for drawing the wire through the plate in this case, when left force is needful, is a kind of a wooden wheel placed horizontally, having in its upper surface small holes at different distances from the axis, into one or other of which, according to the force required,
GOLD.

Gold of Pleionura, in Botany. See Myagrum.

Gold Coasts, or, as it is sometimes called, Guinea proper, a country of Guinea, on the S.W. coast of Africa, bordering on that part of the Atlantic which is called the gulf of Guinea, and extending between three and four degrees from the river Ankobar, or, as others say, from the Colta, or the Almaso, to the Volta, and deriving its name from the quantity of gold which it produces. It is bounded on the north by Congo or Conga, on the east by the Slave coast, on the west by the Ivory coast, and on the south by the gulf of Guinea. It comprehends a number of petty states or kingdoms, viz. Adomin, called likewise Sukru and Avena, Adam, Ankobar, Adom, likewise called Litttle Lakellan, or Wather, Jabi or Jabo, Commendo or Gussafo, Fetu, Sabo, Fantin, Acron, Agonna or Anguina, Amra or Aquambar, Lablede, and Ningo or Lambi. Each of these provinces or kingdoms contains one, two, or more towns or villages on the sea-coast, between, or under the European forts and settlements. Eight of these are real monarchies, having their own proper kings; the rest are republics, governed by magistrates, who are subject to the laws and periodical changes. Upon the river Ankobar, or Cobre, which some reckon the first proper county of the Gold Coast, there is a number of towns, which compose three different provinces of Ankobar or Ancober, Aborr or Aboero, and Eguira, at which latter place the Dutch had formerly a fort, and carried on a considerable trade in gold. Eight leages E. of cape Apollonius stands the town of Axim, called by some Acheniun. (See Achembome and Axim.) See Acrons, Adom, Adomin, Anta, Commando, etc. &c. The country throughout the Gold Coast abounds in hills, adorned with high and beautiful trees, among which are the palm, the cocoa-nut, the papaw, and the banana. The valleys between the hills are wide and extensive, and fit for the plantation of all sorts of fruit; and if they were as well cultivated as watered, they would supply half the coast with provisions. The soil produces in great abundance very good rice, the richest fort of millet with red grain, yams, potatoes, and other roots, all good in their kind. The sugar-cane grows here plentifully, and larger than any where else on the Coast of Guinea. Palm-wine and oil are very good, and very abundant; the country also has plenty of tame cattle and wild bristles. The domestic animals are bulls, cows, sheep, and goats, the last of which are numerous and their fleece is excellent; neither the mutton nor beef is good, but of all animal food dog's flesh is most preferred by the negroes. The wild animals are elephants, tygers, jackulls, boars, deer of various kinds, cats, porcupines, monkeys, rats, mice, &c. &c. Among the birds are pheasants, parrots, macaws, turtledoves, and several others. The reptiles are numerous; such as snakes, serpents, vipers, lizards, scorpions, spiders, &c. The coasts, lakes, and rivers abound with fish, and likewise with alligators and gannets, an amphibious animal, resembling the crocodile, and four feet in length. The climate is very hot from October to March, but during the other months tolerable. The natives are generally healthy; but to Europeans the climate is insalubrious, and often fatal, especially in the months of July and August.

It is observed that of all the countries on the coast of Western Africa, the Gold Coast experiences the most intense heat. Here, a modern traveller, near Rio Volta, has seen Fahrenheit's thermometer as high as 95° in his chamber, and 135° in the open air; compassing by 26° the greatest heat observed by Adamou on all the banks of the Senegal. Although this traveller advanced only 10 miles from Charlottenburg on this coast, his journey is curious. The...
GOLD.

The countries he visited during his short excursion in the interior, are represented as very beautiful, fertile, and populous; they are, in general, woody, but, nevertheless, more healthy than the shores; they are agreeably intermingled with mountains, vallies, and hills. Fresh water, which is scarce and bad on the coast, is here abundant. About five miles from Chritiansburg I first observed a chain of mountains covered with tall trees, and composed of large-grained granite, of gneiss, and of quartz.

The native negroes of the Gold Coast are in general tall, straight, and well-proportioned, with oval faces, sparkling eyes, regular, white teeth, mouths of a moderate size, and lips tinged with a better colour and thinner than those of the negroes of Angola. As to the qualities of the mind, they have a quick apprehension and ready memory, accompanied with an astonishing prescience of mind, and equanimity; but they are generally so indolent that mere necessity puts them upon exerting the faculties they possess. In general, they are crafty, fraudulent, and treacherous; thieves, gluttons, and drunkards, and equally inept and coveous. When they obtain a victory over their enemies, they return home dancing and finging, and when defeated do the same round the graves of their friends and fellow-soldiers. Alkike infensible of grief or joy, they fing till they die, and dance into the grave. The women are proportionably handier than the men, straight, slender, and well-limbed; their chels high, their mouths small, and their eyes indicating vivacity and spirit. They are quick, cheerful, and loquacious; gay in their disposition, and boole in their principles as to gallantry, but temperate in their diet. When the men and women overcome their natural indolence, they are laborious, industrious, and ingenious; and apply with activity and diligence to agriculture or fishing; so far as they are excited by poverty or avarice. Their drefs is various according to their rank and circumstances; but the rage of dres is chiefly prevalent among the women, who are fond of adorning all parts of their bodies with gold, coral, and ivory trinkets; and this rage they derived from the Portuguese and Dutch; as before their arrival men and women went naked to the age of maturity. They are fond of frequent ablutions, and being accustomed to the use of water, they are excellent swimmers and divers from their youth. Besides the natural inhabitants of the Gold Coast, there is a great number of Mulattoes, a mixed progeny, arising from the commerce of Europeans with the black women. This puruous race forms gangs of thieves and plunderers, void of decency, honour, honesty, or principle in their dealings with each other, with the Negroes, or the Europeans. These call themselves Christians, although they are the grosslest of all idolaters, and most of their women prostitute their bodies publicly to Europeans, and privately to the Negroes. The towns and villages of this coast consist of a multitude of little huts or cabins, dispersed in groups, without order or design, and communicating with each other by narrow crooked roads, which terminate in the centre of the town or market place.

It is observably that the further you remove from the coast, the more civilized do the natives appear, at least so far as relates to their mode of building and of living. The common food of the Negroes, in this part of Africa, is a pot of millet boiled to the confidence of bread, yams, and potatoes, over which they pour some palm-oil, and garnish the dish with herbs and putrid fish. This is their meal on common days; and on holidays they feast upon beef, mutton, and fowls. They begin the day with drinking brandy, and conclude the evening with palm-wine, mirth, riot, and tobacco, of which they are extravagantly fond. In eating they are temperate, but very profuse in drinking. Their marriages are encumbered with few ceremonies, and without any previous courtship; and they are as easily dissolved as contracted. Polygamy is allowed among them; and the women are generally doomed to the most laborious offices; they are obliged to cultivate the ground, grow millet, plant yams, and provide subsistence for the husband, who is still spending his time in golfitting, drinking, and smoking. The rich, however, have two wives, who are exempted from labour and all servile employment; and to them the management of the house is intrusted, and a sort of authority over all the other women is committed. It is said to be no uncommon expedient among Negroes to marry, in order to obtain a livelihood by the prostitution of their wives. As the wealth of the Negroes consists chiefly in the number of their family, they are anxious for multiplying their children; and a pregnant woman is treated with great tenderness and respect. A child, as soon as it sees the light, is consecrated by the priest, and has three names given to it. Circumcision is, it is said, though practised in other parts of Africa, is hardly known on the Gold Coast, except at Acra, where it is performed at the time of baptism or consecration. Besides their lawful wives, the Negroes often keep concubines, who are preferred to their wives, and more tenderly treated; nevertheless their children are reckoned illegitimate. But legitimate children never inherit any paternal fortune, in any kingdom on the Gold Coast, except at Acra. In the countries of Egùira, Aćim, Ancobar, Anta, and Adom, there are certain women who never marry, but are dedicated by profession to the public use, and initiated in their vocation in a formal manner. Among the Negroes there is a variety of mechanical arts, in which they are expert; such as the making of wooden and earthen vessels and plates, chair-matings, copper ointment boxes, braclets, necklaces, rings, and ear-rings of gold, fingers, or ivory; and also all sorts of weapons and instruments of war. Their tools, which are rude and simple, consist only of a flone for an anvil, a pair of tongs, a pair of bellows, a file, a saw, and a hammer. They can smith with extraordinary exactness flue-wire, and materials of gold, bracts, and copper. In building canoes, which are of various sizes, from 30 to 14 feet in length, and three or four feet in breadth, the Negroes are very ingenious, and they are no less dex- trooms in the use of them. With regard to the husbandry of the Negroes, they sow in the rainy season, the soil at other times being unmanageably hard; and they adapt their ground to the nature of the grain; owing maize in elevated and dry situations, and rice or millet in low marshy lands, subject to inundations. The natives of the coast, finding it easy to dispose of all their grain, have established corn markets in every village, and the price of grain, in gold-duft, cowries, &c. is rated by certain officers of police, appointed by the king. Hither the men and women meet from considerable distances, bearing heavy burden; and the women especially submit to great labour and fatigue in this way, that they may exchange their heavy loads for European commodities, such as looking-glades, bracelets, ear-rings, glass-beads, and other female trinkets, suited to their taste for dres and finery. The markets are exempted from all duties and imposts. Besides these frequent markets, they have also fairs twice a year for European wares. All the diversions among the Negroes consist of dances, to which they are excessively addicted, music, and mock combats, which often terminate tragically. The principal musical instruments among the Negroes are horns, made of ivory, trumpets, drums of different sizes, and a kind of harp, with five or eight strings.
The honour of the first discovery of the Gold Coast is contested between the French and Portuguese; the French pretend that they were acquainted with Ngritia and Guinea above 100 years before the Portuguese began their discoveries, or about the year 1546 or 1544, but little credit is attached to their accounts of French writers. The Portuguese, it is said, fitted out a ship at Lisbon, under the protection of Don Henry, for the sole purpose of making discoveries along the coast of Africa. At this time Alphonso I. reigned in Portugal. The navigators, it is further said, were driven on an island in the gulf of Guinea, which they called St. Thomas, and where they made a long stay, laying the first foundation of a colony in this island. Having repaired their vessel, they returned to Lisbon, and arrived there in 1544. The Portuguese soon equipped a fleet, and pushed their discoveries as far as Bein, and in process of time arrived in the road of Acre, on the Gold Coast, where they procured a quantity of gold. A number of adventurers from the island of St. Thomas arrived at Elmina four years after the departure of the French. Purchas relates, that Alphonso, having little leisure for pursuing discoveries towards the latter end of his reign, gave an exclusive privilege for five years to Ferdinand Guinea, a citizen of Lisbon, to sail to the coast of Africa: and a person, reputed by him, says Purchas, discovered Elmina; and during this period, were also discovered the islands of St. Thomas, St. Matthew, Annobon, and del Principe. In 1561, John II. encouraged the commercial spirit of his subjects, and projected further discoveries; and it was probably upon this occasion, notwithstanding the assertions of French writers, that the king of England sent a ship and a number of adventurers from the island of St. Thomas, to explore the coast of Guinea, with exclusive privileges. In the reign of Henry III. of France, the French began to renew their voyages to the Grain and Gold Coast. From this period the credit of the Portuguese began to decline, and other Europeans began to open a commerce with the Coast of Guinea. Among others the Dutch engaged in the warfare, which had been prosecuted between the Portuguese and other Europeans; and by perseverance they made themselves masters of the forts of Elmina and Axim; obtaining, by their courage, that security, which the Portuguese had lost by their infidelity and cruelty. The first Dutchman who led the way to Guinea, was one Bernard Erck, in 1597. Running along the Gold Coast, he established a correspondence with the natives, treated them with civility, and alienated their affections from the Portuguese. At length, by their intrigues with the king of Saba, the Dutch obtained permission to build a fort, three leagues E. of Cabo Corfo, or Cape Coast. This fort was finished in 1624, and the Dutch power founded in Guinea, at the time when the States were engaged in a war with Philip IV. of Spain. In the year 1637 they succeeded, after much resistance, in taking the fort of St. George d'Elmina, and in the year 1642 the fort of Axim also fell into their hands. The Dutch, having thus far been successful, proceeded to attack the English settlements. In tracing the first British establishments on the Coast of Guinea, we may begin with observing, that a trade here had been carried on by some private adventurers, without the aid or protection of the government. In 1575 and 1588, Queen Elizabeth granted two patents to certain rich merchants of England, for an exclusive trade to the coast of Barbary, and another for that of Guinea. In 1592 a third patent was obtained by the same body of merchants. In 1651 the republic of England encouraged the African trade; and in 1662 Charles II. granted a charter to a body of merchants, under the name of the Royal Company of England trading to Africa, excluding their limits from the mouth of the Straits to the Cape of Good Hope. This affair of this company falling into disorder, the king created another corporation, called the "Royal African Company," which was founded to this day. This charter bears date, Sept. 27, 1662. This company, with a small capital, was diligent and successful; Cape Coast was enlarged and beautified; the forts of Accra, Dixcove, Winneba, Sakkonda, Commando, and Ananw, were built or repaired, all of them on the Gold Coast, and several within musket-shot of the Dutch settlements. They bought Frederickburg of the Danes, and built a new fort in Winchard. See African Company.

GOLD CROMACH, a town of Germany, in the principality of Bayreuth, which had formerly a gold mine; 5 miles N. of Bayreuth.

GOLDAPP, a town of Prussian Lithuania; 68 miles E. S. E. of Königsberg; Allo, a river of Prussia, which runs into the Romshe; 6 miles N. of Goldapp.

GOLDAST, MELCHIOR HEIMENSVELD, in Biography, a learned writer of the 16th century, was a native of Switzerland. He studied the civil law at Altdorf, but he is better known as a man of letters. His works, though not marked for originality, were highly esteemed by the learned of the period in which he flourished: the principal of these are, 1. "Monarchia Sancti Imperii Romanii," in three volumes folio, published in 1611-14. These volumes consist of a collection of treaties on the civil and ecclesiastical jurisdiction of the empire. 2. "Alemanie Scriptores," in three volumes folio, 1730. "Commentarius de Bohemien Regno," 40. "Informatio de flatu Bohemise quod Jus," 40. "Sylvia Fracnica," being a quarto collection of pieces relative to the maid of Orleans: "Scriptores Rerum Sacram," "Collectio Consuetudinum et Legum Imperialis," "Politica Imperialis," and a collection of letters, written to him by several men of learning. This last work was printed at Frankfort in 1688. Mr. Goldast was of a capricious temper and of changeable habits, which prevented him from rising in the world. He died in 1655, having long struggled with poverty. Moreri, Bayle.

GOLDBERG, in Geography, a town of Silesia, in the principality of Lignitz, deriving its name from a gold mine in its vicinity, which was formerly very rich. The earth, called giglata terra, is dug near it; and the inhabitants are employed in the woollen and linen manufactures; 12 miles S.W. of Lignitz. N. lat 51° 4'. E. long. 15° 53'.—Also, a town of the duchy of Mecklenburg; 15 miles E. of Wilmar.

GOLDECK, a town of the archbishopric of Salzburg; 28 miles S. of Salzburg.

GOLDEN, something that has a relation to gold, or consists of gold, is valuable like gold, or the like.

GOLDEN BELL, Bolla Aurea. See BELL.

GOLDEN CALF was a figure of a calf, which the Israelites cast in that metal, and set up in the wilderness to worship, during Moses's absence in the mount, and which that legislator, at his return, burnt, ground to powder, and mixed with the water the people were to drink of, as related Exod. xxxii.

The commentators have been greatly divided on this article: the pulverizing of gold, and rendering it potable, is an operation in chemisty of the hait difficulty; and it is hard to conceive how it should be done at that time, before chemistry was ever heard of, and in a wilderness too! Many, therefore, suppose it done by a miracle; and the ref, who
allow of nothing supernatural in it, advance nothing but con-
jectures as to the manner of the procets.
Mofes could not have done it by a simple calcination, nor
amalgamation, nor anthony, nor calcination: nor is there
one of those operations that quadrates with the text.
Mr. Stahl has endeavoured to remove this difficulty. The
method Mofes made use of, in making his aurum potabile,
according to this author, was the fame with that which now
obtains; only, instead of tartar, he made ufe of the
Egyptian satron, which is common enough throughout
the East.
Golden Caps, in Geography, a cape of England, on the
W. coat of Dorseth. N. lat. 50° 43'. W. long. 2° 50'.
Golden Caps, a name by which fame call the ranunculus,
or cow-foot.
Golden Eyes, in Ornithology, the Anas Clangula. See
Duck.
Golden Eye, a species of fly. See Chrysopis.
Golden Fleece, in the Ancient Mythology. See Argo-
autic.
Golden Fleece, Order of the, is a military order, instituted
by Philip the Good, duke of Burgundy, in 1429.
It took its denomination from a representation of the
golden fleece, borne by the knights on their collars, which
confided of flints and fleeds. The king of Spain is now
gand master of the order, in quality of duke of Burgundy:
the number of knights is fixed to thirty-one.
It is usually said to have been instituted on occasion of an
immense profit which that prince made by fow; though
others will have a chemical mystery couched under it, as under
that famous one of the ancients, which the adept contem-
porary no other than the secret of the elixir, written on the
fleece of a sheep.
Golden Flower, in Botany. See Chrysanthemum.
Golden Flower-gentle, a name sometimes given to several
species of the amaranth.
Golden Head, in Ornithology, a water-fowl, otherwise
called anna artiea. See Duck.
Golden Island, in Geography, a small island at the entrance
of the gulf of Darien, in Terra Firma, S. America. N.
lat. 8° 20'. W. long. 72° 32'.
Golden Lake, a lake of the island of Borneo. N. lat. 3°
55'. E. long. 115° 45'.
Golden Lang-eart, in Botany. See Hierachum.
Golden Maiden-hair, See Adiantum aureum, and Pol-
ytrichum.
Golden Mouse-eart. See Hierachum.
Golden Number, in Chronology. See Cycle of the Moon,
and Number.
Golden Prelendary, of Hereford. See Prebendary.
Golden Rivers, in Geography, a river of America, which
runs into the Mississippi, N. lat. 43° 20'. W. long. 92° 2'.
Golden River, or Rio del Oro, a river of America, which
runs into the Spanish Main, N. lat. 14° 44'. W. long. 82°
55'.
Golden Red, or Sarracen's Wound-eart, v Regina aurea, in
Botany. See Soldago.
Golden Red Tree. See Boscia.
Golden Rule, in Arithmetic, a rule or praxis of great ufe
and extent in the art of numbers, whereby we find a fourth
proportional to three quantities given. The Golden Rule
is also called the Rule of Three and Rule of Proportion.
See its nature and ufe under the article Rule of Three.
Golden Sapphire is a species of the inda or eclecampane.
(See Ixila.) It grows naturally on the sea-coasts in many
parts of England, and is sometimes sold in the London mar-
ket for the true sapphire, though entirely deftitute of its
warm aromatic tale. See Sapphire.
Golden Saviffre. See Chrysopelum.
Golden Stede, order of the. See Stole.
Golden Sunflower of Antimony. See Antimony.
Golden Thistle, in Botany. See Scotoles.
Goldenstein, in Geography, a town of Moravia, in
the circle of Olmutz; 32 miles from Olmutz.
Goldentritt, a town of Germany, in the county of
Diepholz; 14 miles N. of Diepholz.
Goldentraun, a town of Upper Laffatia; 16
miles S.E. of Gorlitz. N. lat. 50° 27'. E. long. 15° 26'.
Goldingen, a town of the duchy of Courland, erected
near the river Weta, defended by an old castle, and con-
taining two churches; 48 miles W.N.W. of Mitoaw. N. lat.
56° 51'. E. long. 21° 44'.
Goldehlaute, a town of Germany, in the county of
Henneberg, 12 miles N.E. of Meiningen.
Goldman, Nicholas, in Biography, a mathematician,
was born at Bredaf, in Silefia, in the year 1625, and died at
Leyden in 1665. The works by which he is generally known
are "Elementa Architecrie Militaris," 1643, "De
Ufe Proportionum Circuli," "De Stylometria," 1662,
and another treatife on Architecture," published in 1696,
with numerous engravings, and the life of the author. Mo-
rer.
Goldoni, Charles, was born at Venice in the year
1707. Almoff from his infancy he gave indication of a hu-
morous charafter, and a propensity to dramatic performances.
Before he could well read he became an author, and wrote the
plan of a comedy by the time he was eight years old. This
piece presided so much merit, that it required the testimony
of respectable witneses to verify its being the production of a
child. He received the elements of education at Venice,
from this city he went to the Jesuits' college at Perugia to
study rhetoric, and afterwards he studied philosophy at Ri-
mont. His mind was, however, too deeply engaged in thea-
trical exhibitions to make the fylum of Aristotle a predo-
ninant purfit. Every leisure moment he spent at the thea-
tre, till at length he passed from the pit to the flage, and
joined a company of players. This, by his own account, was
an error, which drew after it many feros confequences. He
had been intended by his father for the profession of phyfic,
which he was unable to study: he was then solicited to prepare
himself for the bar, and was engaged, after many changes, in
practice at the courts of Venice. After this he was appointed
secretary to the Venetian refident at Milan, where he became
acquainted with the manager of the theatre, and wrote a
fare for him, entitled "The Venetian Gonderer," which
was performed and printed: by degrees he became united to
the company, and compos'd many pieces for them. He now
turned his thoughts towards reforming the Italian stage, and
so earnest was he in his projects, that it is laid in a single year
he wrote sixteen new comedies, besides forty-two other
pieces for the theatre, and among these are reckoned some of
his best productions. The first edition of his works was pub-
lished in 1753 in 10 vols. 8vo. After this he published many
additional pieces under the title of the "New Comic Theatre."
He had compos'd 59 other pieces so late as the year 1761,
and here closes the literary life of Goldoni in Italy. He
now repaired to Paris, and was as zealous in his endeavours to
reform the Italian theatre there as he had been in his own
country. His firft attempt was in a piece called the "Fa-
ther of Loves," but the bad fucceds of this comedy was a
fufficient warning to him to defist from his undertaking. He
continued, during the remainder of his engagement, to pro-
duce pieces agreeable to the general taste, and published twenty-
GOLDI is, perhaps, the only author of comic operas in Italy, who has given them a little common sense, by a natural plot, and natural characters; and his celebrated comic opera of the "Buona Figliuola," set by Piccini, and first performed in London Dec. 9th, 1766, rendered both the poet and composer, whose names had scarcely penetrated into this country before, dear to every lover of the Italian language and music, in the nation. This admirable production, before it was brought hither, had favored the imprezzario of the opera at Rome from ruin, and been performed in the principal cities of Italy. In the year 1760, Piccini, passing through Rome, in his way to Milan, was entreated to compose a comic opera for the Teatro delle Dame in that city, which had lately been very unfortunate. No libretto was ready, and application having been made to the poet Goldoni, at this time in Rome, he furnished the musical drama of "La Buona Figliuola," from his comedy of "Pamela," in a few days. Several of the original performers were now in London, particularly the first buffo, Lovatini, and the famous man Savoi, with the buffo carico Morigli. And though females are not allowed to appear on the stage at Rome, yet Signora Guadagni had previously performed the part of Cecchina in several cities of Italy, with great and well-deserved applause before his arrival here.

After the great success of the "Buona Figliuola," the public was disposed to hear with partiality any productions by the same authors; and when the "Buona Figliuola Mattita," (or Pamela in high life,) was brought out, the crowd at the opera-house was prodigious; but expectation, as usual, was so unreasonable as to spoil the feast; to gratify it was impossible. Some ascribed their disappointment to the composer, force to the performers, but none to themselves. The music was excellent, full of invention, fire, and new effects; but so difficult, particularly for the orchestra, that the performers forgot it was winter. The principal part of the Marchesa was given to Zamparini, a very pretty woman, but an affected singer. Multi fo difficult to perform was not easy to hear; and this drama was never sufficiently repeated for the public to be familiarly acquainted with it. They were glad, as well as the performers, to return to the "Buona Figliuola" for their own cause and relief from a too serious attention.

In France, Goldoni wrote several very successful comedies for declamation in the French language, but we are not acquainted with any dramas which he produced for music in that country. Poor Goldoni was in such favour with the royal family of France before the revolution, that he was never allowed to return to his own country; but died at Paris in the year of terror, 1793, at the age of 83.

GOLDSBOROUGH, in Geography, a small town of America, in Hancock county and state of Maine, incorporated in 1789, and containing 379 inhabitants; 47 miles E. of Penobscot. N. lat. 44° 19'.

GOLDSINNY, in Ichthyology, a fish discovered on the coast of Cornwall, in the whole form of the body, lips, teeth, and fins, resembling the wrasse, which is said never to exceed a palm in length; near the tail is a remarkable black spot; the first rays of the dorsal fin are tinged with black. See Labrus Cornubius.

GOLDSMITH, Oliver, in Biography, was born in the county of Longford, Ireland, in 1731, though, according to other accounts, this event took place at Elphin, in 1739. He was the son of a clergyman, who gave him a literary education, and sent him early to Dublin college. Being designed for the profession of medicine, he was removed to Edinburgh in 1751, where he continued till 1754, when he left that place to avoid a process against him for
for debts incurred, probably to administer to his dissolution. He was interdicted at Sunderland, and thrown into confinement, from which he was released by the kindness of two fellow-collegians. After this, he determined to visit the continent, embarked for Holland, and travelled through Flanders and part of Germany, paused some time at the universities of Strafburg and Louvain; at the latter place he took his degree of bachelor of physic, and thence accompanied an English gentleman to Geneva. Here he engaged himself as travelling tutor to a young man who had become possessed of a large fortune, but whose mind was ill-adapted to do credit to the gifts of Providence. They disagreed in the south of France, and Goldsmith was left to contend with the hardships of indigence in a foreign country. He returned in 1754, and had in most of his peregrinations trial for his support to his own exalted efforts. His learning enabled him a favourable reception at the monastery, and his German flute fiddle failed to procure him a maid and a night's lodging from the penury, who were delighted with strains which a poetical audience would have treated with disdain. His arrival at London with a few pence in his pocket, was not likely to be the termination of his precarious difficulties. He attempted to get into the employ of an apothecary, but his appearance being against him, his application was treated with disdain. He at length was admitted as usher to Dr. Miller, who kept an academy at Pockham. Here he remained but a short time, and then resolved to follow the profession of an author in London. He obtained some employment in the Monthly Review, and furnished papers for the public Ledger. He published a weekly pamphlet, entitled "The Bee," and "An Enquiry into the State of Polite Learning in Europe." After he had been some time exerting his pen in obscurity, he became a member of a club, and as poet, by the publication of his "Traveller," or a Prospect of Society. This work had him by him in MS. some years, and it was at the instigation of Dr. Johnson that he prepared it for the press. That great critic declared it as his opinion, that there had not been so fine a poem since the days of Pope. In this decision the public concurred, and the author was, almost immediately, introduced to the most eminent literary characters of the age. In the following year was published his novel of the "Vicar of Wakefield," which had been sold to a bookseller some years before, but had been kept back as the work of an unknown writer, and exciting no expectations of success. It was, however, received with unbounded applause, and has ever since borne a distinguished rank among similar compositions. His next work was a "History of England," in a series of letters from a nobleman to his son, in two volumes 12mo., a work that still continues to be read with great delight. His poetical fame reached its summit in 1756, by the publication of his "Deserted Village," which was universally admired. For this he obtained of his bookseller 100l. a sum which appeared to the author so exorbitantly great, that he refused to take it; but the sale of the work convinced him that he might fairly appropriate the sum out of the profits. As an author of comedy, he produced in 1768 "The Good-natured Man," which was not very successful; and in 1772 another play, entitled "She Stoops to Conquer," or "The Mill-dakes of a Night." From this Goldsmith cleared a large sum, and it is still occasionally reprinted to applauding audiences. Notwithstanding the successes of his pieces, by some of which he is alleged to have cleared 120,000l. in a single year, his circumstances were never very prosperous, which was partly owing to the liberality of his disposition, and partly to an unfortunate habit which he had contracted of gaming; the arts of which he knew very little of, and consequently became the prey of those who were base enough to take advantage of his simplicity. Besides the works already treated of, Dr. Goldsmith, as he was called, though he had only taken a bachelor's degree, compiled an English history in four volumes, and a Roman and Grecian history in two volumes each; and "A History of the Earth and Animated Nature," in eight volumes 8vo. Such was the confidence which he acquired in his skill at composition, that he formed a plan for a much greater work, viz. "A Dictionary of Arts and Sciences," but this and other schemes which he had planned were cut off by his untimely death. A dependence of mind, probably occasioned by the consciousness of the bad state of his affairs, had been secretly weighing upon him, when in March 1774 he was attacked with the symptoms of a low fever, under which he died on the 4th of April. He was buried in the Temple churchyard without much attendance, but a monument has since been erected to his memory in Westminster Abbey, with a Latin inscription by Dr. Johnson.

Goldsmith, as a man, was rather admired for his genius, and beloved for his benevolence, than solely esteemed. The bent part of his moral character was a warmth of sensibility, which made him in all fortunes ready to share his purse with the indigent, and rendered him in his writings the constant advocate of the poor and oppressed. The world feature was a malignant envy and jealousy of successful rivals, which he sometimes displayed in a manner not less ridiculous than offensive.

As a writer, no one of his time was possessed of more true humour, or was capable of more poignancy in marking the follies of individuals. This talent he displayed in a very amusing manner in his poem entitled "Retaliation," written as a retort to the jocular attacks made upon him in a club of which he was a member. His literary fame stands highest as a poet, in which character a place may be given him perhaps at the head of the minor class, the term minor being applied with relation to the quantity, rather than the excellence of composition. It would not be easy," says his biographer, "to point out in the whole compass of English poetry, pieces that are read with more delight than "The Traveller," or "The Deserted Village." The elegance of the versification, the force and splendour yet simplicity of the diction; the happy mixture of animation with glowing description, are calculated to please equally the refined and the uncultivated taste. The moral and philosophical views of society they exhibit are, indeed, objectionable; yet upon the whole they exert a favourable influence over the heart. In addition to these capital works, the "Homer," and some short humorous and miscellaneous pieces, complete the catalogue of his performances in verse. As a profe writer he deserves high praise for style, which he adapts with great felicity to his subject, and which, whether elevated or plain, is always clear, pure, and unaffected. Life prefixed to his poems. Europ. Mag. A. A. Regis.

GOLDWIN, John, an ecclesiastical composer, was brought up under Dr. William Child, and, in 1667, succeeded him as organist at the free chapel of St. George at WindSOR. In 1703 he was appointed master of the choirs there, in both which stations he continued to the time of his death in 1719. Dr. Boyce, out of a great number of anthems by this composer, selected one for four voices, "I have set God always before me," which he has inserted in the second volume of his "Collection of Cathedral Music," and well characterized it with respect to the modulation, by saying that "it is singular and agreeable."
GOLDYLOCKS, in Botany. See CHYSOCOMA and CYPRIDIFLORUM.

GOLDAH, in Geography, a town of Bengal; 18 miles E. of Ramgun. N. lat. 22° 28'. E. long. 85° 51'.

GOLDET in Geography, a Portuguese, in the kingdom of Tunis; 25 miles N. of Tunis. Ala, a narrow channel between the lake of Tunis and the sea, defended on each side by a castle.

GOLF, or GOFT, the name of a diversion or exercise, much used in Scotland, and played upon the lawns or links, as they are there called.

It consists of driving a ball with clubs, between two goals or holes, half a mile or a mile asunder. He who can do this with the fewest strokes of his club is the conqueror.

GOLFO Trinidi, in Geography, a bay on the coast of South America, in the government of Caracas. N. lat. 10° 30'. W. long. 68° 20'.

GOLGAM, a town of Hindoustan, in Dowlatabad; 15 miles N. of Beder.

GOLGOM, a town of the island of Ceylon; 48 miles N.W. of Candy.

GOLGONTHA. See CALVARY.

GOLIATH, in Scripture History, a famous giant of Gath, who defied the armies of Israel, and was slain by David. 1 Sam. vii. 4, &c.

GOLICH, in Geography, a town of Ruffia, in the government of Irkottich, on the Lena; two miles S. of Orenburg.

GOLINDA, a small island near the N. coast of Cuba. N. lat. 23° 20'. W. long. 80° 4'.

GOLISANO, a town of Sicily, in the valley of Demara; 9 miles S. of Catania.

GOLTZ, a town of Nubia, on the left side of the Nile; 34 miles W.N.W. of Dongola.

GOLLIUS, James, in Biography, was born at the Hague in 1596; but he pursued his studies at Leyden with the most unremitting diligence and ardour, and became distinguished for his deep knowledge of the learned languages, antiquities, philosophy, and mathematics. In 1622 he accompanied an embassador of the United Provinces to Morocco, where he excelled the admiration of the emperor Muley Zedan, with whom he had frequent interviews. After his return to his native country he succeeded to the Arabic professorship on the death of Erpenius, under whom he had formerly studied. In 1625 he obtained permission to travel in the Levant, and sailed more than a year at Aleppo, whence he made various excursions into Arabia and Melopotamia. On his return he visited Constantinople, where he obtained very distinguished notice from the learned in that capital, by whose means he had access to the best libraries. During his absence he was appointed professor of mathematics, and returned to Leyden in 1629, and applied himself to the duties of his office. He died in 1667, having occupied with much credit the arduous situation of professor for more than forty years, and passed through all the academical honours. As an author he published the "Saracen History of Elmacins," which had been begun by Erpenius: also a life of the great Tamerlane, written by an eminent Arabian author: "The astronomic Elements of Alrigan," with a new version and learned commentaries: "An Arabic Lexicon," a "Persian Dictionary," which was printed in London. Bayle. Moret. Moret.

GOLIUS, Peter, brother of the preceding, entered when very young among the Carmelites; like his brother he excelled in the knowledge of the Arabic language, and taught it in the seminary belonging to his order at Rome, where those monks were educated who were intended to be sent on missions into the East. Golius was destined for this service, and having visited every part of Syria and Palestine, founded a monastery of his order on mount Libanus, over which he presided till he was recalled to Rome. Here he was employed as one of the principal scribes of Sergius Riusus, archbishop of Damascus, in preparing his edition of the Arabic bible, which was published in 1671 by the direction of the college "De Propaganda." After it was completed, Golius was appointed visitor of the missions of the East Indies. He died in this employment at Surat about the year 1673. He was an author of translations into Arabic of Thomas a Kempis' imitation of Jesus Christ: of sermons on the Evangelists: an "Historic distinctif of St. Gregory of Decapolis," several small devotional pieces, and a translation from Arabic into Latin of a "Collection of Parables and Proverbs," Moret.

GOLIUS, or GOLUS, in Geography, a town of Africa, near the river Grande, the inhabitants of which trade in flax, ivory, and cotton.

GOLLING, a town of the archbishopric of Salzburg, on the Sulza; 14 miles S.S.E. of Salzburg.

GOLLOSING, a town of Bengal; 70 miles W. of Midnapour.

GOLNITZ, a town of Hungary, on a river of the same name; 14 miles S.E. of Kapidoff.

GOLNOW, a town of Anterior Pomerania, formerly Hanizzac, situated on the Ihna; 12 miles N. of Stargard. N. lat. 53° 37'. E. long. 24° 57'.

GOL, a river of Corinca, which rises nearly in the centre of the island, and pouring a N.E. course, runs into the sea; 12 miles S.E. of Baia. It gives name to one of the two departments into which the island is divided; the other being Liame. Gol comprehends the northern division of Corinca, in N. lat. 42° 30'; and containing 165 square leagues, and 124,466 inhabitants, is subdivided into three circles, viz. Baia, whose inhabitants are 47,832; Calvi, having 26,282 inhabitants; and Corte containing 35,542 inhabitants. There are several lofty mountains near the centre of a chain that traverses the island longitudinally. The most considerable lakes are Ino and Cremo, the former of which is of unknown depth. The soil is tolerably fertile, yielding barley, millet, olives, cherries, wine, fruits, &c. On the hills are woods and excellent pastures. See CORINCA.

GOLDBUNGE, a town of Bengal; 10 miles E. of Silhet.

GOLPHINGTON, the chief town of Washington county and state of Georgia, in America, situated near the head of Ogeechee river, about 20 miles E.S.E. of Savannah town.

GOLPS, in Hertford, are roundels, or torteaux, of a purple colour.

GOLTBERGENSIS TERRA, in the Materia Medica, a whittish earth, used in the shops of Germany and Italy as an astringent, a cordial, and a sudorific, but little known among the English apothecaries. It is dug in many parts of Germany, as Goldberg and Strigaw, and Ligugut in Silesia; but particularly at this time in the neighbourhood of Halte, in the bishopric of Lige, in the circle of Wellphalia. It is taken up there in considerable quantities, and usually is mixed with the impression of an egg, and with its old name Golbergensit terra under it. It was imagined to contain some particles of silver, and thence to derive some of its virtues; on this account Montanus called it aequa bund; but experience shows that it doth contain a particle of that metal. It is a delectable compact
compact earth of a dull greyish white, soft and friable, and adheres firmly to the tongue, and makes no effervescence with acids.

GOLTZEN, in Geography, a town of Lusatia; 10 miles W. of Lubben. N. lat. 51° 58'. E. long. 13° 30'.

GOLTSZENUS, HUBERT, in Biography, a painter, who was born at Venlo in 1520, and studied under Lambert Lombard. Becoming enamoured of the antique by having copied several works of that class, he resolved to cultivate his taste by visiting the most important Greek works preserved at Rome; and therefore travelled to that city, where he resided some time, and thence drew an ample stock of materials for his future progress in the art he professed.

He lived principally at Antwerp, where he painted the history of Japhet; but as he was engaged in a variety of studies, his pictures are rare. Among other things he investigated coins and medals, and published a collection of them with critical annotations. He died at the age of 63.

GOLTSZENUS, HENRY, an artist of considerable talent, who practised both painting and engraving. As a painter, he drew his resources from the study of the antique, of Raphael, Phidias, and Michael Angelo; the last of whom appears to have been his favourite Apollo in the art, but while whole structures he exaggerated in an outrageous manner, seldom attaining any of his beauties. Hence his style of design is inharmonious and caricature; and his expressions partake of the same taste; but his sense of hue in colour is rich, vigorous, and transparent. He died in 1617, aged 59.

GOLUBERIK, in Geography, a town of Prussia, in the territory of Culin; 24 miles S.E. of Culin.

GOLUBENSIA, a town of Ruffia, in the country of the Coiffacks, on the Don; 200 miles E.N.E. of Azoph.

GOMAHNY, a town of Hindostan, in the circuit of Murghange; 45 miles N.W. of Harriopour.—Also, a town of Bengal; 8 miles S.S.E. of Goragot.

GOMAR, FRANCIS, in Biography, celebrated as the great opponent of Arminius, and from whom the Calvinistic party in Holland received the name of "Gomarists," was born about the year 1563 at Bruges. His parents had been brought up in the Roman Catholic religion, but having embraced the Protestant doctrines, they retired into the province of Limburg in 1578, for the sake of professing their principles in peace and security. Their son Francis was sent to Straf惊喜 for his education, and pursued his studies there under the celebrated John Secundus, after which he went to New-Radt, where the professors of Heidelberg had been obliged to retire by the elector Lewis, because they were the opponents of the Lutheran faith. In 1582 he took a journey to England, and attended the divinity lectures at the universities of Oxford and Cambridge. He was admitted to the degree of B.D. in the year 1584. By great affluence he became very deeply learned in the Greek and Hebrew languages, and in 1587 he settled with a Dutch congregation at Frankfurt, and continued to discharge his ministerial functions, in that connection, until the year 1591, when his flock was entirely dispersed by persecution. In the following year he was invited to accept the theological professorship at Leyden, and having taken his degree of D.D. he entered upon the duties of his new station. In 1603 Arminius was appointed his colleague, and openly and zealously opposed the gloomy doctrines maintained by John Calvin, and made many converts in the university. This roused the attention of Gomar, who declared himself his opponent, disputed with him in the schools of Leyden, and published treatises to excite the orthodox to make a firm stand against his doctrines, which he represented to be profane and impious; he went much farther, and endeavoured to provoke against him the indignation of the States of Holland, before whom the two combatants disputed twice in the year 1608. On one occasion, when Barneveldt exclaimed that he was grateful to God that their controversies did not affect the fundamental articles of the Christian religion, Gomar protested "that he could not appear before the throne of God with Arminius's errors," thus vainly setting limits to the mercy of the most high and most merciful God. In 1611, seeing that his opponents increased in numbers and in strength, Gomar resigned his office, and retired to Middleburg. After this, he accepted the professorship of divinity, first at the academy of Saumur, and then at the university of Groningen, and at the latter place he was employed as the Hebrew professor, in addition to that of theology. He was present at the synod of Dort, and took an active part in procuring the infamous decrees by which the Arminians were condemned and proscribed as corrupters of the true faith, and enemies to their country. He died at Groningen in 1641, leaving a distinguished character for sound learning, particularly in the Oriental languages, but it cannot, and it ought not to be concealed, that he disgraced the character of a Christian minister by his bigotry and intolerance. As an author, he published many treatises, but chiefly on controversial subjects, which were collected and printed at Amsterdam, in the year 1645. He was also concerned in revising the translation of the Old Testament, printed at Leyden, with notes in the year 1637. Moreri. Bayle.

GOMASTAHPOUR, in Geography, a town of Bengal, 42 miles N.W. of Nattore.

GOMAUN, or KEMISOON, the name of mountains of Afa, called also thosc of Sewalics; an extensive ridge, which seems to form the exterior barrier of the Thibetan Alps in Sirinagur, &c.

GOMBAULID, JOHN OGER DE, in Biography, a French poet of the seventeenth century, was the younger son of a gentleman of the Protestant religion, to which he adhered. He was educated at Bourdeaux, and came to Paris about the time of the death of Henry IV., and frequented the court of Mary de Medicis. Of her he obtained a pension of 1200 crowns, which was but ill-paid, and which was soon reduced nominally to one-third of that sum; so that, notwithstanding his high patrons, he passed much of his life in a state little above indigence. He was elected one of the first members of the French Academy, and was so extremely zealous for its great object, the purity of the language, that he once proposed to the academicians that they should bind themselves by oath to use no words but such as were approved by the majority of the society. He lived to a good old age, and died in 1666. He was author of many tragedies, tragi-comedies, pastoral and romances, sonnets, epigrams, &c. He also engaged in theological controversy, and wrote "Treatises and Letters concerning Religion," in favour of the Protestants. Gombauld was very ready at repartee, and his wit did not leave him even in old age, for his latest publication was a collection of epigrams. Moreri. Bayle.

GOMBERT, NICOLAS, a disciple of Jufquin, who published two books of motets for many voices in 1552. He set to music a Latin epitaph on his master Juf-quin;
and at this time composers being scarce, he gained some reputation among those of Flanders, with very little genius. For after performing the tedious task of scoring the music of the Anna at Julquin, we found its chief merit to consist in imitations of its admirable master. This composition was in the third ecclesiastical mode of E, with a minor second, as well as third; which M. Blainville some years afterwards paid to the public for a third or new key, different from the major and minor, which comprise all secular music at present. And it is extraordinary, that this pretension should have had any abettors in a Roman Catholic country, where old compositions in this mode are daily performed in cathedrals and collegiate churches. However, it was a matter of wonder and debate, during some time, in France. See Mercure de France, 1751, and Dict. de Mus, par Rouillé, art. Mode.

GOMBERVILLE, MARIN LE ROI, SIEUR DE, a man of letters, was born at Cherveure, in the diocese of Paris. He became distinguished at the age of fourteen by a collection of quatrains in honour of old age. In 1635 he was so much distinguished for a literary reputation, that he was of the number enrolled by cardinal Richelieu for the purpose of founding the French Academy, He had published romances and works of a light nature, of which he afterwards seemed to be ashamed, for at the age of forty-five he formed the resolution of confecrating his pen to religion. He even adopted a penitentary course of life, and is mentioned by some of his contemporaries as having joined the Christian virtues to those of morality. He died in 1674, leaving behind him many works, of which perhaps the best is a "Discours sur les Vertus et les Vices de l'Histoire et de la Maniere de bien écrire." This is deemed a fallen and very judicious performance. Moreiri.

GOMBESY, in Geography, a town of Africa, in Botonga, on the Zaanbeze S. lat. 13°. E. long. 36°.

GOMBESZALE, a town of Peria, in the province of Fariñata; 100 miles N.N.W. of Schiras.

GOMBIN, GABIN, or GABIS, a town of Poland, in the duchy of Warfaw, situated on the river Buira; 34 miles N.E. of Rawas.

GOMBRON. See GAMBRON.

GOMER, in Scripture History, the son of Japheth (Gen. x. 2.), and, according to Josephus, father to the people of Galatia. The ancient inhabitants of that country were called Gomares before the Galatians fixed possession of it. The Chaldees place Gomer in Africa; Bocchart in Phrygia, but the Phrygians, in Greece, have the same figuration (a coal) as Gomer, in Hebrew and Syrian. Others are of opinion that the ancient Chimri, or Cummerians, sprung from Gomer, and probably from them the Welsh, called Cymri. It is not improbable, that Gomer, or the Gomerites, his descendants, peopled likewise Germany and Gaul; the name German not differing much from Gomeron. Chavier (Germ. Antig. i. c. 6.) conjecturing that the ancient Celta comprehended Illyria, Germany, Gaul, Spain, and the British isles, as all these people successively spoke the same language; further supposes, that Gomer, or his family, peopled the countries in Asia, between the Parainius and Mount Imaus, and between the confines of the Oxus and Oby; whence these people are called Gomares by Poleni (l. vi. c. 17.) and Mela (l. i. c. 2.).

GOMER, or GOMER, an Hebrew measur. See CORUS.

GOMERA, or VELES DE PEISON, in Geography, a caille of Africa, in the country of Fez, built on a rock near the coast of the Mediterranean. Before this fortress there was an ancient city, called "Belis," supposéd to have been founded by the Cartagilians. The Arabs called it Bris and Velis, whence Veles. These two places, surrounded by mountains and forests, were supported by the building of ships for fishing and piracy, before they were taken by the Spaniards.

ALTO, a river of Fez, which runs into the straits of Gibraltar, near the above-mentioned fortresses.

GOMERA, or GOMERA, one of the Canary islands, about 20 miles long and 10 broad, having a capital of the same name, situated on the coast, with a good harbour. The island is fertile and well cultivated, and produces sugar-canes and vines in abundance, as well as silk, together with sufficient corn for the supply of the inhabitants, who amount to about 7000; 18 miles S.W. of Teneriffe. N. lat. 28° 6'. W. long. 17° 37'.

GOMETRA, one of the western islands of Scotland. This is a small island at the west end of Ulva, tolerably fertile, but without wood.

GOMEZ DE CIUDAD REAL, ALVAREZ, in Biography, a modern Latin poet, was born in 1858 at Guadalupe in Spain. He was page of honour to archduke Charles, afterwards emperor. As an author, who entitles him to a place in this work, he possessed a great facility in writing Latin verse, which is seen by his "Thalia Christiana," or the triumph of Jesus Christ, in twenty-five books: "Muta Paulina," or the epitaphs of St. Paul, in elegiac verse: the Proverbs of Solomon, and other works of a similar kind. His work on the order of the Golden Fleece, entitled "De Principis Burgundi Militia quan Vellera aurei vocant," is reckoned his master-piece. The subject which he chose in this instance was more favourable to poetry than the others.

GOMEZ DE CASTRO, ALVAREZ, a native of St. Enalha, near Toledo, was educated at Alcala, where he obtained a high character for diligence and zeal in learning. He was patronized by Philip III., who engaged him to prepare an edition of the works of Idorie, which death prevented him from completing. He was author of many works; but the chief, and that which is most esteemed, is a "Life of Cardinal Ximenes," infcrcted in a collection of the writers on Spanish history. Gomez died in 1580, at the age of 65. Moreri.


GOMEZ, SEBASTIANO, a Malatla slave of the Spanish painter Murillo, who employed his leisure hours in painting, and obtained considerable success. The city of Seville is, or was, adorned with many of his works; the most conspicuous among them were a "Madonna with the Infant," in the portico of Leof. Mercenarios Defchalos, and the "Flagellation of Christ," at the Capuchins. It is not known at what period he died; but he is said to have survived his master, whose decease happened in the year 1685.

GOMGAIHI, in Geography, a town of Hindoostan, in the circuit of Surgoga; 22 miles S.W. of Surgoga.

GOMI, a town of the province of Gueric, on the Black sea.

GOMMERN, a town of Saxony, on the Elbe; 8 miles E. of Magdeburg.

GOMNALPAR, a town of Hindoostan, in the circuit of Guntur; 8 miles E. of Innacanca.
GOMORA, a small island in the East Indian sea, near the west coast of Oby. S. lat. 1° 52'. E. long. 128°.

GOMORRAH, in Ancient Geography, a town of Palestine, and one of the principal cities of the Pentapolis, confused by fire from heaven. It was probably the most northern of the five cities. Gen. xix. 24.

GOMOZIA, or GOMEZIA, in Botany. See NERTERIA.


Gen. Ch. Cal. Perianth inferior, of five lanceolate, sharpish, ribbed, coloured, deciduous leaves, two of which have a membranous margin at each side, one on one side only, and two are defective of any. Cor. Petals five, spreading, longer than the calyx, rather unequal; the claws are shorter than the calyx, each gradually widening into a roundish, flat, entire border. Stam. Filaments ten, very short, thick and angular; anthers erect, shorter than the calyx, square, tapering upwards, bearded at the top, on the outside, by two pores. Pei. Germin placed on a short flabby angular receptacle, with five angles and five divisions; style longer than the flabbes, marked with five furrows; stigma acute. Peric. Drupes from one to five, most generally two, ovate, obliquely attenuated at the base, somewhat compressed, obtuse, erect, flabbling on a very large globular receptacle, which is undivided, if the berry be solitary, lobed if there be more, one lobe being appropriated to each berry. Seeds solitary, ovate.


Vahl and Swartz describe five species, all trees, natives of tropical climates. The chief and original one is G. Jabotopita, (Ochsa: Jabotopita. Linn. Sp. Pl. 732. Jabotopita pyramido foetra luteo, fructu rubro; Plum. t. 147. t. 153.) This is a native of South America, flowering in December and January. The wood is soft and tough. Leaves simple, as in the whole genus, alternate, thick, ovate, acute, ferrated. Flowers in terminal clusters, yellow, fragrant, compared by Markgrace to those of a Wall-flower in figure, or rather colour, but he says their scent is sweeter. The fruit and its receptacle are black, juicy, aromatic.

This genus is certainly very nearly related to Ochsa, both in habit and character.

GOMPHELIS, from γομπήλα, a nail, a disorder of the teeth, in which they become loose and painful. The connection of the derivative with the Greek is imputable to the circumference of the teeth being fixed in their sockets, like nails in a piece of wood.


Gen. Ch. Cal. Perianth inferior, small, in five acute, permanent segments. Cor. of one petal, regular, in five deep, reflexed segments, deciduous. Nectary of five hooded leaves, simple within, confined with a tooth at each side, placed on the top of the united filaments. Stam. Filaments five, coherent; anthers of two cells, terminated by a membrane, and producing two compressed masses of pollen, which attach themselves by a taper point to the stigma, and remain pendulous there. Pei. Germin two, superior, ovate, fleshy two, very short, standing close together; stigma common to the two, dilated, horizontal, flat, with five angles to receive the masses of pollen. Peric. Follicles two, inflated, ovate, pointed, clothed with soft spines. Receptacles membranous, longitudinal, linear, at length separate. Seeds numerous, imbricated, prismatic, crowned with silky down.


This genus is separated from Aplepis by Mr. Brown, (whole effay on the whole order, and whose discovery of the node in which the pollen is projected by the anthers upon the stigma, do him the highest honours,) on account of the inflated prickly fruit, and the angular horns which in Aplepis grow out from the bottom of the nectaries. It consists of Aplepis arborea, Linn. Mant. 215; suhrotis, Linn. Sp. Pl. 315; and setif, Vald. Synb. v. 1. t. 82; and, as Mr. Brown infers, of cripia, Linn. Mant. 215. Suppl. 170. A. pufite, Linn. Mant. 215; is, as he judiciously observes, on the authority of the late excellent Mr. Dryander, borrowed from the Linnaean herbarium, the same plant as arborea, with a synonym from Phikeot (t. 139. t. 11.) and Morison, which is presumed to be cripta.

GOMPHELLOLISM, so named by the writer of the present article, from γομπήλα, a nail, club, or anything swelling upwards from a narrow base, and γομπήλα, a pod, or legume, expressive of its tumid fruit. Sm. Tr. of Linn. Soc. v. 4. 220. Ann. of Bot. v. i. 505.—Clas. and order, Dendrosia Moneypug. Nat. Ord. Papilionaces. Linn. Leguminosae, Jaff.

Gen. Ch. Cal. Perianth inferior, of one leaf, coriaceous, short, bell-shaped, in five deep, oblong, pointed, unequal segments. Cor. papilionaceous. Standard very large, inferrly heart-shaped, carinated at the back, recurved, with a short claw. Wings shorter than the standard, parallel, horizontal, with a prominent lobe on one side near the base. Keel the length of the wings, of two half-ovate, tumid, clawed petals, with a revolved tooth at the upper edge of each. Stam. Filaments ten, concaved in the keel, and turned inwards, united, unequal in length; anthers vertical, roundish, two-lobed. Pei. Germin filiform, oblong, somewhat cylindrical; style awl-shaped, ascendent, as long as the flabbes; stigma simple, acute. Peric. Legume on a stalk, nearly globular, inflated, of one cell, crowned with the style. Seeds several, roundish, ranged along the upper future on short stalks.


Five species of this genus are defined in the Transactions of the Linnean Society, v. 9. 249. G. grandiflorus, Exot. Bot. t. 5. = J. tubuliflorum, (Jumbretiu; Exot. Bot. t. 58.) J. tubuliflorum, a species communicated by Mr. Menzies: minus, very near the last, except in the acute recurved points of the leaves: and pinatum, a small species from Port Jackson, remarkable for its pinnate leaves, and zigzag herbaceous form. Probably the subliterate volume of Mr. Brown's Prodromum will add more to this number.

The habit of Gomphelellis is marked by the compound (terinate or pinnate) leaves, and a certain aspect of rigidity and smoothness. The stipules are not intralocular as in Potter.
GOMPHOSIS, in Anatomy, from γομμα, a nail, denotes the manner in which the fangs of the teeth are fixed in their sockets.


Gen. Ch. reformed. Cal. Perianth inferior, coloured, membranous, permanent, double; the outer two large, compressed, keeled leaves, cohering by their inner margins, and one smaller; inner in five deep, awl-shaped, upright, downy segments. Cor. of one petal, tubular, cilindric, the length of the inner calyx; its margin equally five-cleft, spreading. Stam. Filaments five, very short, inserted into the orifice of the corolla, betwixt its segments; anthers erect, roundish, closing the mouth of the corolla. Pilt. Gernate ovate, pointed, superior; Hyles short, cohering at their bottom part; stipules simple, obtuse, scarcely reaching to the flaments. Peric. Capsule roundish, membranous, of one cell, bursting all round. Seed solitary, large, roundish, with an oblique point.

Eff. Ch. Calyx coloured, the outer of three unequal bands, inner in five deep segments. Corolla cylindrical, five-toothed, bearing the flaments at its orifice. Capsule bursting all round. Seed solitary.

The species of Gomphrena come under the denomination of Everlillas, or Amaranths, on account of the permanent nature of their calyx when dried, which retains its original colour and splendour.

G. globosa, Globe Amaranth, a native of India, is commonly raised on a hot-bed, and planted out in our borders, like other tropical annuals. It is also frequently kept in pots to decorate the flower or greenhouse. The original crimson form is much more handsome than the paler variegated variety.

G. prenus, figured in Dill. Hort. Elth. t. 20, a native of Buenos Ayres, is scarcely cultivated but in curious gardens, having small heads of yellowish flowers of no remarkable beauty.

There are eight species besides in Willdenow, of which the arborensis, Linn. Suppl. 173, is by far the most remarkable. This was not sent to Linnaeus by Mutis from New Granada, as erroneously affiated by the younger Linnaeus in the Supplementum, but by Vandelli, who received it from Brazil, and who has described it under the name of Dracaena, in his Fita. Plant p. 6. The stem is woody, round, leafy, clothed with rigid, prominent, brown hairs, as are also the leaves, which are opposite, ovate, ovate-oblong, entire, about three inches long, and half as broad. Heads terminal, solitary, the size of an African Carigold or Tagetes, pale red or whitish, composed of innumerable flowers, the segments of whose calyces are above an inch long, linear, acute and cataphyll, clothed in their lower part with long dense silky hairs. We know of no figure of this fine plant.

Mr. Brown, Prodr. Fl. Nov. Holl. v. 1. 416, adds four new species to Gomphrena, while he removes from it the begonias and veronicatc, which, with two new ones from the tropical part of New Holland, he forms into a new genus, Phlox. He considers what we term corolla in Gomphrena, as the tube of the united filaments.

Gomphrena, in Gardening, contains a plant of the flowery annual kind, of which the species cultivated is, the annual globe amaranth (G. globosa.)

It is a fine flowering plant, the heads of which at their first appearance are globular, but as they increase in size become oval, and, according to Martyn, the flowering heads are extremely beautiful, and, if gathered before they are too far advanced, retain their beauty several years.

There are varieties with fine bright purple heads, with white or silvery heads, which never alter from seeds, with mixed colours, with purple and with white head, which last are much smaller and rounder than the others; the plants also grow much larger and spread more into branches, and are later before they flower; these are called batclor's buttons in America.

Method of Culture.—It may be increased by sowing the seeds annually, in pots of light fresh mould, in the early spring months, and plunging them in the bark hot-bed. When the plants are up, they should be watered often with care; and, after they have attained some growth, be removed with balls about their roots into other pots, and replunged in the hot-bed. When they have had some growth in this situation, they should be removed into a deep frame, being placed in a fresh hot-bed, to bring them up tall and handsome. Afterwards they should often be refreshed with water, and have air admitted freely as the summer advances, till they are capable of bearing it without injury; when about Angust they may be set out during the day-time, being protected in the night, and from wet weather. At this period they should be watered three or four times a week at least, in a rather sparing manner.

They afford a good effect when set out in the principal situations about the house, in assemblage with other plants of the potted kinds.

GOMRAPENDY, in Geography, a town of Hindoostan, in the Carnatic; 25 miles N. of Madras.

GOMS, one of the seven independent dixains or commonwealths of the Upper Vallaus, in Switzerland, called dixain, because the Upper and Lower Vallaus comprehend 10 districts, each being a dixain or tenth of the whole. Goms is situated at the foot of mount Grison, and extends along the bank of the Rhone; and is from called from a town, 33 miles E. of Sion. See Vallaus.

GOMUT, a river of Bengal, which runs into the Magna, near Chandipour.

GOMUT PEPERS, a town of Hindoostan, in Doowatobad; six miles N. of Amedanagar.

GOMUTTRA SPALGITA, in Natural History, the name given by the Indians to a kind of foulfl, found in great plenty on the mount Vindy in the East Indies, in places, as they observe, where the cows frequently urinate. It is a bituminous substance, and after calcination the residuum is given in cases of internal ulcers and in gonorrhæas. The Indians suppos'd it formed by the drying up of the cow's urine.

GONAGRA, composed of γονας, knee, and γάρ, i.e., capturis, sitting in Medicine, the gout in the knee. See Gout.

GONAM.
GONAMBOUCH, in Ornithology. See Emberiza Gêrtha.

GONANPILLY, in Geography, a town of Hindoostan, in the coser of Ellore; 18 miles N. E. of Ellore.

GONAP, one of the smaller Banda islands, in the centre of which is a volcano. The only inhabitants are wild hogs, cows and serpents. S. lat. 4° 10'. E. long. 130° 34'.

GONARCHA, a term in the ancient dialling. Mr. Perrault, in his notes on Vitruvius, lib. ix. cap. 9, takes the gomarcha to have been a dial drawn on divers surfaces or planes; some of which being horizontal, others vertical, oblique, &c. formed divers angles.

Whence the appellation, from γον, knee, or γονα, angle.

GONARY, in Geography, a town of Hindoostan, in the Pylus; 12 miles S. of Rydroog.

GONAVE, LA, an island situated on the west side of St. Domingo, about 14° leagues in length, and about three in breadth. This is called Grand Gonave by way of distinction from Petit Gonave, another small island about two miles in each direction, separated from the S.E. corner of the former, by a channel three miles wide. Gonave is 13° 3 leagues W. by N. W. from Port au Prince. N. lat. 18° 51'. W. long. 73° 40'. See St. Domingo.

GONAVES, a sea-port in the above-mentioned island, at the head of a bay of its own name, on the S. side of a bay of Leogane. The harbour is excellent; the town has a medicinal spring, and in 1772 both were erected with lodging-houses for the accommodation of those who return to it, and an hospital for soldiers and sailors. It lies on the great road from Port de Paix to St. Mark, 16 leagues S.E. of the former. N. lat. 19° 22'. W. long. 73° 20'.

GONCANAAMA, a town of S. America, in the diocese of Quito 80 miles S. W. of Loxa.

GONCELIN, a town of France, in the department of the Loire, and chief place of a canton, in the district of Grenoble; 13 miles N. N.W. of Grenoble. The place contains 1558, and the canton 10,259 inhabitants, on a territory of 1074 kilometres, in 14 communes.

GONDAR, the metropolis of Abyssinia, is situated upon a hill, elevated 840 feet above the ocean, and consists of about 10,000 families in times of peace. The houses are chiefly constructed with clay, and the roofs are thatched in a conical form, which is the mode of building within the tropical rains. On the west end of the town is the king's houle, formerly a structure of considerable importance; it was a square edifice, flanked with square towers; formerly four stories high, and the top of it afforded a magnificent view of the whole country S. of the lake Tzama. Although the greatest part has been burnt at different times, there is ample lodging in the two lowest floors of it; the audience chambers being above 120 feet long. Annexed to this ruined palace are apartments, constructed by succeeding kings, also of clay, according to the fashion of their own country; for the palace itself, says Bruce (Travels, vol. iii.) was built by masons from India in the time of Facidias, and by such Abyssinians as had been instructed in architecture by the Jesuits, without embracing their religion, and afterwards remained in the country, unconnected with the expedition of the Portuguese, during this prince's reign. The palace and its contiguous buildings are surrounded by a stone wall, 30 feet high, with battlements upon the outer wall, and a parapet roof between the outer and inner, by which you may pass along the whole and have a view of the street. There never appear to have been any embrasures for cannon; the four sides of this wall are above 13 English mile in length. The mountain, on which the town is situated, is encircled on every side by a deep valley, which has three outlets; the one to the south, to Dembëa, Mainfâw, and the Agows, the second to the N.W., towards Sennar over the high mountain Debra Tzai, or the mountain of the Sun, at the foot of which Kofame, the palace of the Iteghé, is situated, as are also the low countries of Walkayt and Walduba; the third is to the N. to Woggora, over the high mountain Lamalmon, and on through Tigré to the Red sea. The river Kaha, coming from the mountain of the Sun, runs through the valley, and covers all the foot of the town; the Angrah, flowing from Woggora, surrounds it on the N.N.E.; these rivers join at the bottom of the hill, about a quarter of a mile S. of the town. On an eminence opposite to Gondar, on the other side of the river, is a large town of Mahometans, consisting of about 1000 houses. They are all active and laborious, and are employed in taking care of the baggage, and field-equipment of the king and nobility, when they take the field and return from it; but they never fight on either side. N. lat. 12° 34'. E. long. 37° 33'.

GONDEBAUD, in Biography, third king of the Burgundians, celebrated as a legislator among the barbarians over whom he reigned as sovereign. He obtained the crown in 491, and almost immediately, under pretence of afflicting Odoacer against Theudoric, entered Italy, carrying fire and sword through Æmilia and Liguria, and made a great number of captives, many of whom he liberated without ransom, at the request of Epiphanius bishop of Pavia. He assembled, in 499, a council at Lyons, in order to effect a reconciliation between the Catholics and Arians. He was himself an Arian, from habit and education; but he was unable to effect so laudable a purpose. About this time he was attacked and defeated by Clovis king of the Franks; who made the Burgundian monarch his tributary. Clovis returned to his own country, and Gondebaud revenge himself upon his brother Godegelf, who had joined Clovis, surpried him, and put him to death. From this period he reigned in peace over his people, whom he rendered flourishing by the arts of civilization, and by a regular system of laws. Thence, says the historian, were in general founded on equity, and display much sagacity in preventing all causes of dispute; nevertheless, they enjoin the barbarism of judicial combats, which the legislator justified as an inference from the admitted doctrine of the interference of a particular providence in human affairs. The Burgundian code, called "La loi Gombertette," has been published in several collections of ancient laws. This prince died in 516, leaving behind him, as memorials, letters upon theological subjects to Avitus, bishop of Vienne. Univer. Hist.

GONDICOTTA, or Gondlaomma, in Geography, a river of Hindoostan, which forms the nominal boundary of the Carnatic, and discharges itself into the sea at Medipelly, Combam, or Commun, is near its source. It is sometimes called Gillaugama, and Gunta-camma.

GONICOTTA, a town of Hindoostan, in Marawar, 33 miles N. of Trumian.

GONDOLA, a little flat boat, very long and narrow, chiefly used at Venice to row on the canals.

The word is Italian, gondola. Du Cange derives it from the vulgar Greek γόνδολη, a bark, or little flòs; Lancelot deduces it from γόνη, a term in Athenaeus for a sort of vase. The middle-sized gondolas are upwards of thirty feet long, and four broad, they always terminate at each end in a very sharp point, which is raised perpendicularly to the full height of a man.
The address of the Venetian gondoliers, in paffing along their narrow canals, is very remarkable: there are usually two to each gondola, and they row by pulling before them. The fore-man holds his oar on the left side of the gondola: the hind-man is placed on the stem, that he may fix the head over the till or covering of the gondola, and holds his oar, which is very long, on the right side of the gondola.

GONDOLA is also the name of a passage-boat of six or eight oars, used in other parts of the coast of Italy.

GONDOLIÆ, in Natural History, a name given by authors to a peculiar kind of **concha ____** (supposed, in some degree, to represent the shape of a Venetian boat. It is of the genus of the **dolium**, and there are seven species of it. See DOLIUM and CONCHOLEY.

GONDOMAR, in Geography, a town of Spain, in Galicia; 6 miles E. of Bayona.

GONDRECOURT, a town of France, in the department of the Meuse, and chief place of a canton, in the district of Commercy. The place contains 1113, and the canton 8773 inhabitants, on a territory of 340° kilometres, in 24 communes.

GONDUFEE, a town of Africa, in the kingdom of Kongo; 150 miles S.E. of Kongo.

GONDWARAH, a town of Bengal; 15 miles S.S.W. of Purnea.

GONESE, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Pontoise, nine miles N. of Paris. The place contains 2400, and the canton 14,811 inhabitants, on a territory of 1821 square kilometres, in 22 communes.

GONET, John Baptist, in Biography, was born at Bziers in the year 1616. He embraced the ecclesiastical life when he was young, and was admitted to the degree of doctor of divinity by the university of Bourdeaux in the year 1642. He was at the same time elected to the professorship of theology in that university, an office which he held with great dignity till the year 1671, when he was appointed provincial among the Dominican friars. In 1675 he refuted his labours as professor, which he continued about two years, and then retired to his native place, where he died in 1681. He was author of a voluminous work, entitled **"Clyperna Theologia Thomistica, contra novos ejus impugnatores"**, first published at Bourdeaux in 1666, in eighteen volumes 12mo., but it was afterwards enlarged, and printed in five volumes folio. He was likewise author of a **"Manuale Thomilariun, seu brevis Theologiae Cursius,"** which has passed through different editions, of which the best was published at Lyons in 1681: and **"Difficiliora Theologiae de Probabilitate."** Moreci.

GONFALON, or GONFAXON, a kind of round taut, borne as a canopy, at the head of the proceffions of the principal churches at Rome, in cafe of rain; its verge or banner serving for a shelter, where there is not a great deal of attendance.

GONG, a Chinese metallic musical instrument of percussion, in the form of a flat basoon, with a ridge round it, and beaten by a mallet covered with several folds of woollen cloth. It is carried on a pole by two men, and beaten by the hindmost. In the march of an army, it is used as a military instrument to regulate the steps of the soldiers; when struck with great force, it is sufficiently loud to be heard at a mile’s distance; but so confused is the sound, that no distinct tone can be ascertained. Yet by reiterated gentle strokes on the same part of the bottom of the basoon a musical tone may be produced; but different parts of the circle produce tones of different gravity and accent.
lyrical, in which style he so much excelled, as to be termed by his countrymen "the prince of lyric poets." Gon
gora poësties, in the elimination of his countrymen, a very high rank among the Spanish poets for an artificial elevation of language, and uncommon turn of thought, which were formerly the characteristics of the poetry of that nation. So much, indeed, did he surpass in these qualities, that he had many cenfurers in his own country, though he also met with as many warm defenders. He is said to have enriched his native language by the introduction of many Latin words happily employed. Morei.

GONGRONA, in Surgery, a hard tumour; but especially a bronchocele, or swelling of the thyroid gland. The tree is said to be derived from γυνώς, a round tubercle on the trunk of a tree.

GONHARY, in Geography, a town of Hindooftan, in Ouade; 40 miles W. of Lucknow.

GONIA, a town of Asitie Turkey, in Natahia; 16 miles W. of Aphiom-Karnian.

GONIAH, or Konig, supposed to be the Conche of D'Anville, and the Gong or Delibe, a kingdom of Africa, situated to the N. of Guinea, between the meridian of Greenwich, and 5 W. long, and between the 19th and 20th degrees of N. lat. It is about 870 miles westward from Cadha or Kaffina, and between 530 and 620 miles from the Gold Coast. Some say, there is no communication between this coast and the country of Gonjah; the king of Af
tonio, who poësties the intervening space, prohibiting his inland neighbours from passing through his country. Others report, that other races (e. g. the Fonctes, and their confedera
tes) lie between Affentio and the sea; and that the Affen
tois have often unsuccessfully attempted to open a communi
cation with the coast.—Alfo, the name of a town, which is the capital of the kingdom of Gonjah or Kong. N. lat. 11° 30'. W. long. 30'.—Alfo, the name of part of a chain of mountains, extending from almost the mouth of the river Gambia, in the Atlantic, to Nigritia, towards Aby
finia.

GONIAH, a decayed town and large castle of Asitie Turkey, belonging to the province of Guriel, at the mouth of a river which runs into the Black Sea. It is garrisoned by a few Janifaries, and inhabited chiefly by Kamen; 80 miles E.N.E. of Treibfond. N. lat. 41° 25'. E. long. 41° 10'.

GONJENPILLY, a town of Hindooftan, in the Car
tatie; 18 miles N.E. of Nellore.

GONIACARPUS, in Botany, so called from γωνία, an angle, and καρπός, fruit, expressive of one of its essential characters. The name, originally contrived by Thunberg, was Goniacarpus, which being incorrectly con
tstructed, and too near Coniacarpus, was judiciously changed by Mr. Konig. Schreber, Wildenow, and others, have made it Gonocarpus, for want of attending to its meaning and application, which has no reference to γωνία, γωνίς, a knee, but to the very pe

Gen. Ch. Calyx Perianth superior, in four deep, acute, equal, upright segments. Cor. Petals four, equal, oblong, concave, inserted into the rim of the calyx, and twice as long as its teeth. Stam. Filaments four or eight, very short, inserted into the calyx, opposite to the petals if four, to the petals and calyx-teeth if eight; anthers oblong, large, shorter than the corolla. Pfl. Germin inferior, turbinate, with eight furrows and as many angles, crowned with the permanent calyx; style extremely short; stigma four, ob
tu, downy.


Three species of this inconspicuous though curious genus are at present known.

1. G. mieranthus. Thumb. Jap. 69. t. 15.—Leaves ovate, obtusely crenate, smooth, as well as the stem.—Gathered by Thunberg in Japan. Root fibrous, annual. Stems three or four inches high, ascending, quadrangular, smooth, leafy, simple below, panicled above. Leaves opposite, on short flanks, ovate, rather acute, half an inch long, bluntly crenate and cartilaginous in the margin, smooth on both sides, minute
ly dotted, furnished with a rib, but no veins; the upper ones gradually smaller and more entire. Stipulas none. Flowers very small, purplish, drooping, in several broader, lax, upright, spikes, forming a sort of panicle. The petals as well as calís
are sufficiently evident in Thunberg's own specimens before us. The fruit is no bigger than the smallest pin's head, and the portion scarcely larger than the tube. In consequence of these
peculiarities, it is not much esteemed by the Indians.

2. G. rotundifolius. —Leaves rounded, somewhat heart-shaped, obtusely crenate, smooth. Angles of the stem rough. Spikes in a compound panicle.—Gathered near Port Jackson, New South Wales, by John White, M.D.—We are by no means certain that this is more than a variety of the former, but its different country, much more rounded leaves, heart-shaped at the base, and the brilly angles of the stem, induce us to propice it as a species. Possibly the panic
ded spikes may be owing to the greater luxuriance of the fse
cimens. The fruitification appears precisely like that of the frill species.

3. G. feaber. Konig Ann. of Bot. v. 1. 547. t. 12. f. 6.—Leaves elliptic-lanceolate, sharply ferrated, briskly as well as the stem.—Gathered by Mr. David Nelson, in cultivated ground in the island of China, near Macao. This appears to differ from the two former very materially, being all over rough, with defrizzled bristles, and having longer and nar
rower sharply ferrated leaves. The flowers, moreover, have eight filaments, and the angles of the fruit are wavy or crifi
ced, not smooth and even.

We have a plant gathered by Dr. White, near Port Jack
fon, which seems to answer in every point to Mr. Konig's description and figure of the bulb, except that its petals have a brilly keel, and the figmas are singularly branched and plumose, making a large tuft in the centre of each flower after the petals are fallen. Perhaps Mr. Konig's fpecimens had lost all their figmas. We remark, however, a further difference in the fruit, whose alternate angles are left distinct, or rather more cresped and interrupted than the rest. Not having examined authentic fpecimens of G. feaber, we must leave this matter in doubt.—Possibly this may be G. tetrag

GONIOMETER, an instrument used for the purpose of measuring fold angles (particularly of crystals), or the inflexion which one plane surface makes with another. The small goniometers, as usually found at the shops, are of a con
struction to simple, as to require but little description. They generally consist of a small pair of compasses orippers, de
tined to receive the angle of the crystal; and the legs of these being continued in the opposite direction, beyond the angular point or joint, the angle is measured by applying them to a protractor or semicircular scale of degrees.

But notwithstanding much ingenuity has been bestowed on instruments constructed on this principle, none of them have
GONIOMETER.

Goniometer.

have been found nearly accurate enough for the purposes for which they are required, many interesting questions in the modern science of crystallography requiring a much more exact determination of the angle than can possibly be obtained by instruments of this construction.

We are indebted to Dr. Wollaston for having removed all these difficulties, by the invention of an instrument which accomplishes all that the most scrupulous naturalist can possibly desire. The principle of this invention is entirely optical, and (Plate XIX. Mijoflans, fig. 2.) represents the instrument as made and held by Mr. Carty, in the Strand; but the reader, when acquainted with the nature of it, will readily see that any person possessed of a graduated instrument, such as a theodolite, transit, &c. may, without great difficulty, apply it to the measurement of angles, though in a much less commodious manner than on an instrument made expressly for the purpose.

Dr. Wollaston’s method consists in employing a ray of light reflected from the surface, instead of the surface itself; and thus, for a radius of 15-inch, we may substitute either the distance of the eye from the crystal, which would naturally be twelve or fifteen inches, or for greater accuracy we may, by a second mode, substitute the distance of objects seen at a hundred yards or more from us. The instrument described by Dr. Wollaston, in the Transactions for 1829, consists of a circle, fig. 3, graduated on its edge, and mounted on an horizontal axle supported by an upright pillar. This axle, being perforated, admits the passage of a smaller axle through it, to which any crystal of moderate size may be attached by a piece of wax, with its edge, or intersection of the surfaces, horizontal and parallel to the axis of motion. This position of the crystal is first adjusted, so that by turning the smaller axle, each of the two surfaces, whose inclination is to be measured, will reflect the same light to the eye. The circle is then set to zero, or 180°, by an index attached to the pillar that supports it.

The small axle is then turned till the further surface reflects the light of the candle, or other definite object, to the eye; and lastly, (the eye being kept steadily in the same place,) the circle is turned by its larger axle, till the second surface reflects the same light. This second surface is thus ascertained to be in the same position as the former surface had been; the angle through which the circle has moved, is, in fact, the supplement to the inclination of the surfaces; but as the graduations on its margin are numbered accordingly in the inverted order, the angle is correctly shown by the index, without requiring any computation.

It may be here observed, that it is by no means necessary to have a clean uniform fracture for this application of the instrument to the cructure of laminated substances; for even all those small portions of a flattered surface that are parallel to one another, (though not in the same plane,) glinten at once with the same light, the angle of an irregular surface may be determined nearly as well as when the reflecting surfaces are actually in the same plane. In this method of taking the measure of an angle, when the eye and candle are only ten or twelve inches distant, a small error may arise from parallax, if the intersection of the planes or edge of the crystal be not accurately in a line with the axis of motion. But such an error may be rendered insensible, even in that mode of using the instrument, by due care in placing the crystal; and when the surfaces are sufficiently smooth to reflect a distinct image of objects, all errors from the same source may be entirely obviated by another mode of using it.

For this purpose, if the eye be brought within an inch of the reflecting surface, the reflected image of some distant chimney may be seen inverted beneath its true place, and, by turning the small axis, may be brought to correspond apparently with the bottom of the house, or some other distant horizontal line. In this position the surface consequently bicsets the angle which the height of that house subtends at the eye, or rather at the reflecting surface: then, by turning the whole circle and crystal together, the other surface, however small, may be brought exactly into the same position; and the angle of the surfaces may thus be measured, with a degree of precision that has not hitherto been expected in goniometry.

The accuracy, indeed, of this instrument is such, that a circle of moderate dimensions, with a vernier adapted to it, will probably afford corrections to many former observations. Dr. Wollaston has remarked one influence of a mistake that prevails, reflecting the common carbonate of lime, which he mentions, because this substance is very likely to be employed as a test of the correctness of such a goniometer, by any one who is not convinced of its accuracy, from a distinct conception of the principles of its construction.

The inclination of the surfaces of a primitive crystal of carbonate of lime, is stated with great appearance of precision to be 104. 28° 30′: a result deduced from the supposed position of its axis, at an angle of 45°, with each of the surfaces, and from other deducing circumstances of apparent harmony by simple ratios.

But however strong the presumption might be, that this angle, which by measurement approached to 45°, is actually so, it must nevertheless be, in fact, about 45° 20′; for the inclination of the surfaces to each other is found to be very nearly, if not accurately, 105°, as it was formerly determined to be by Huygens; and since the measure of the supficial angle, given by Sir Isaac Newton, corresponds with this determination of Huygens, his evidence may be considered as a further confirmation of the same result; for it may be presumed, that he would not adopt the measures of others without a careful examination.

Explanation of the Figure.

a b, Is the principal circle of the goniometer, graduated on its edge.

c c, The axe of the circle.

d, A milled head, by which the circle is turned.

e e, The small axe for turning the crystal, without moving the circle.

f, A milled head on the small axe.

g, A brass plate supported by the pillar, and graduated as a vernier to every five minutes.

h, The extremity of a small spring, by which the circle is turned at 180°, without the trouble of reading off.

i i and k k, Are two centres of motion, the one horizontal, the other vertical, for adjusting the position of a crystal, one turned by the handle l, the other by the milled head m.

The crystal being attached to a worm head at the point n, in the centre of all the motions, with one of its surfaces as nearly parallel as may be to the milled head m, is next rendered truly parallel to the axis, by turning the handle l till the reflected image of a horizontal line is seen to be truly horizontal. By means of the milled head f, the second surface is then brought into the position of the first, and if the reflected image from this surface is found not to be horizontal, it is rendered so by turning the milled head m, and since this motion is parallel to the first surface, it does not derange the preceding adjustment.
GONIMETRICAL LINES, derived from lines, angles, and angles, in Geometry, used for measuring or determining the quantity of angles. Such are lines, tangents, secants, versed lines, &c.

We have a paper by Mr. Jones, in the Philosophical Transactions, containing a commodious disposition of equations for exhibiting the relations of goniometric lines, from whence a multitude of curious theorems may be derived. See Phil. Trans. N. 483. sect. 26.

GONIUM, in Zoology, a genus of Vermes, characterized only by their very simple, flat, and angular form, and being invisible to the naked eye. The species at present known are few, amounting to no more than five in number; and for the existence of these we rely chiefly on the microscopical researches of Muller and Schrank, the former of whom describes four of these minute creatures with great accuracy in his "Zoologia Danica." They are mostly inhabitants of fresh or pure water, though some of them occur in flagrant water or in dung-hills.

Species.

POLYSPIERIUM. Orbicular, pellucid, with immemorable spherical molecules. Schrank.

Found in flagrant water; the colour greenish-yellow, and general appearance that of a thin membrane filled with immemorable lucid globules. Very common in the month of July.

PECTORALE. Quadrangular, pellucid, with sixteen spherical molecules. Müll. Goere, &c.

The molecules are oval and nearly of an equal size, their colour greenish, pellucid, and diffused in a quadrangular manner within the membrane, like diamonds in a ring; or rather, as Müllé compares them, to the jewels in the breast-plate of the high priest among the Jews, and reflecting light on both sides. Its progress is by an advancement alternately towards the right and left, at which time all the molecules are in motion, and assume their oval form, these molecules being round when the animal is in a quiescent state.

TRUNCATUM. Angles obtuse; posterior part arched. Müll.

This occurs in fresh or pure water, and is rarely met with; its size is rather considerable; the fore-part is a straight line, the sides forming therewith obtuse angles, the extremity of the sides being united by a curved line; the internal organs, perceptible to the eye by the assistance of the microscope, consist of a number of molecules of a dark green colour, and two vesicles of peculiar brightnes in the middle. Its motion is languid.


The projection of the body of the body in this species is placed in a right angle; the intestines green, with the larger vessels transparent.

PLANATUM. Quadrangular, opaque, with four cylindrical protruberances. Müll.

This species, according to Müller, appears under a light magnifier like a quadrangular membrane, plain on both sides, but, when a deeper lens is applied, resembles the figure of a botter, formed of three or four cylindrical pillows, flattened or fink in various places; this was the appearance it assumed when first examined; some days after all the sides were plain without convexity and decoluted, or divided into little squares by the interjunction of straight lines. It is found in puddles under dung-hills.

GONKEER, in Geography, a town of Chinefe Tartary. N. lat. 44° 50'. E. long. 117° 51'.

GONKOFEN, or Gankofen, a town of Bavaria; 14 miles E. of Landshut.

GONNA, a town of Hindooftan, in Lahore; 12 miles W. of Nungorete.

GONNI, or Gono, in Ancient Geography, a town of Greece, in the Peraeis; situated near Panonis, towards the strait where the Olympus and Offa approached each other.

GONOCONDLUM, a town of Greece, in Macedon, in the Peraeis.

GONOESSA, a town of Greece, in the Peloeponnesus.

In the time of Pausanias it belonged to the Sicyoniens.


Gen. Ch. Cal. Perianth inferior, of one leaf, in five deep, acute, spreading segments, permanent. Cor. of one petal, wheel-shaped, in five deep spreading segments. Nectary like a shield, crowning the stamens, lobed. Stam. Filaments five, thickish, united into a short tube; anthers burring transversely, terminated by a membrane, their malleus of pollen attached to the outer extremity, with respect to the cell, and covered by the stigma. P. Germanus two, ovate-oblong; filies two, very short, close together; stigma common to both, flatish and depressed, with five angles. Peric. Pouches inflated, or less angular or ribbed. Seeds numerous, imbricated, oblong, crowned with down.


This appears to be a numerous genus, properly separated from Cymosia, and consisting of climbing shrubs, with opposite broadish leaves, and flowers growing in umbels between the infection of the foot-stalks. They are natives of America, chiefly within the tropics. Examples of it are Cymosia matthewi, Linn. Nat. 54. Jacq. Amer. 87. t. 56, a hairy plant, with dark-purple blossoms; falsa, Linn. Sp. Pl. 316, figured in Dilh. Hort. Eth. 239. f. 256, likewise a downy species, with purplish-green flowers; and crispiflorum, Ait. Hort. Kew. v. 1. 302. Plum. 1c. t. 216. f. 1; as well as many others presumed to have the same generic characters, but which, according to Mr. Brown, require to be thoroughly examined, as does the whole genus. Michaux enumerates three species, natives of the warmer parts of North America, and which he calls G. macrophyllus, bifurtes, and levis.

GONON DESAIR, in Geography, a mountain on the E. side of the island of Java, famous for the quantity of pepper which its trees produce.

GONG, or GANAPHE, one of the group of Asiatic flies, called Banda, in which there is a remarkable volcano.

GONOR, a town of Hindooftan, in the circuit of Go-

GONORHYNCHUS, in Ichthyology, a species of Gyrinus, which feed.

GONORRHCEA, in Surgery, a disease in which a kind of matter, which is either actually put, or a fluid of very similar qualities, is discharged from the urethra of the male subject, and from the surfaces of the labia, nymphi, clitoris, and vagina of the female, attended with more or less heat, pain, and difficulty in making water. The discharge is infectious, and capable of communicating the complaint from one person to another, whenever it comes into
into contact with any of those surfaces, which are susceptible of contamination by it, and which, we believe, must be such as are naturally defined to secrete mucus. On the foregoing account, the disorder is almost always caught, or communicated, in the venereal connection, when one of the discharge of the diseased person is applied to the parts, which are liable to be infected in the healthy one. However, a gonorrhoea may be produced in any manner, which brings the infectious discharge into contact with the mouth of the urethra, the surfaces of the labia, &c. In the article Ophthalmry, we shall have occasion to notice a particular inflammation of the eyes, attended with a copious discharge of matter from beneath the eye-lids, which is represented, by surgical writers, as originating from the inadvertent application of gonorrhoeal matter to the eye-lids, the inner surfaces of which are well known to be mucous ones.

The Hunterian doctrines go so far as to assert, on the authority of experiments, that the poison of the lues venerea, and that of gonorrhoea, are in fact the same, though usually productive of opposite effects, by reason of the parts affected in a change, and those concerned in gonorrhoea having quite different structures. These things, if true, tend to prove, that the matter of a clap may under certain circumstances, impart the venereal discharge to the constitution. However, it should be understood, that the statement just now made can only refer to the gonorrhoea virulenta; for it is certain, that a simple discharge from the urethra, and a scalding sensation in making water, which would constitute a gonorrhoea, may be the consequence of any thing which produces mere irritation in the passage without the possibility of the venereal or common gonorrhoeal virus being at all concerned. Thus, a man may have a irritation, and begin the employment of bougies for its cure; their irritation may bring on a forens on the urethra, and excite a discharge. Here we have an instance of the complaint arising from the operation of no virus whatever; but altogether from the unequino, mechanical, irritation of the bougies. Doubtless, also, there are sometimes discharges both from the male and female parts of generation, which, when applied to other persons, are capable of bringing on certain kinds of gonorrhoea by the entire effect of their irritation. So were a man, with a gonorrhoea, excited by the irritation of bougies to have connection with a woman, there is no doubt that the latter would be very likely to become troubled with a discharge and scalding in making water, merely in consequence of the application of some of the matter from the male urethra to the surfaces of the labie, nymphae, &c.

The arguments which have been adduced to shew that the poison of one form of gonorrhoea, and that of the venereal disease are the same, will more properly come under consideration hereafter. In the meanwhile, it is our part to enter a little more particularly into the history of gonorrhoea.

The etymological meaning of gonorrhoea is a running of the semen, the term being derived from γόνον, signifying the seminal fluid, and γένεσις, to flow. The ancients are said to have entertained the very erroneous notion that the discharge consisted of an oozing of the semen in a morbid and altered state. As it is long since no absurd supposition has had any partisans, a refutation becomes superfluous, and every one now knows, that in the preface, as in many other examples, truth and etymology are not coupled together. Dr. Svedenius, who has found fault with the term gonorrhoea, as conveying an untrue idea, has not been happy in a substitute.

He remarks, that if a Greek name is to be retained, he would call the complaint blenorragia, from βλένω, mucus, and μετέχειν, to flow. Now this epithet is objectionable, on the identical principle which makes Dr. Svedenius wish for the relinquishment of gonorrhoea; for it is generally thought by all the most eminent modern surgeons, that the discharge is pus, and not mucus. Besides, we do not see much utility in abandoning the ancient appellation. The knowledge of surgery is now so highly cultivated, that there is not the least danger of any man imbuing an absurd opinion respecting this common complaint, from the etymological import of its name. Every juvenile apprentice knows that a clap is a running of matter from the urethra. Few common practitioners trouble themselves about Greek derivations; and where is the object of changing the name of one disease, while many hundred other surgical terms flound in equal, and often greater, need of alteration?

The first perceptible symptom of a gonorrhoea is generally a kind of itching about the orifice of the urethra, attended with a slight swelling of its edges, and sometimes extending over the whole of the glans penis. Very shortly afterwards the running commenceth, and the itching sensation changes into pain, which is severely felt at the time of making water. In some few instances, no considerable pain is experienced, till a long while after the access of the discharge and other symptoms. It is said that there are certain cases which are attended with no pain whatsoever, while other instances occur, in which patients suffer severely, even before the discharge makes its appearance.

When the inflammatory symptoms have come on, the penis seems swollen, and as if it were in a state of half-elevation. The glans appears red, smooth, and enlarged, with a kind of transparency about it. Sometimes it is affected with a slight excoriating, which makes it exceedingly tender, and is the source of some trivial quantity of matter. The canal of the urethra becomes narrower than natural, if we may form a judgment from the diminution which takes place in the diameter of urine. Indeed, very frequently, this fluid can only be discharged in a broken scattered current, or by drops. We have often seen severe retentions of urine attendant on the inflammatory stage of a gonorrhoea.

Small tumours may frequently be noticed along the inferior surface of the penis, in the course of the urethra. These swellings have been considered as the mucous gland of that canal in a swelled state. Sometimes they acquire a very large size, and ultimately suppurate and form abscesses, which, in some instances, burst externally, while, in others, they break into the urethra itself. In the latter event, the swelling all on a sudden subsides, as soon as the contained matter has escaped. Sometimes, after a certain interval, the tumour is seen to re-appear, which circumstance is said to be owing to a premature cloiture of the opening. Abscesses of the preceding kind are often met with in the situation of Cowper's glands. Here they also sometimes burst outwardly, sometimes inwardly, sometimes in both ways, in the same patient. In this last case a new passage is made for the urine, termed a fistula in perineum. See Fistula.

A painful sensation is frequently felt by the patient along the lower surface of the penis, extending as far as the anus, and depending on the inflamed state of the urethra. In most cases the erections are frequent, and generally productive of infinite pain, particularly when a forensis exilis along the track of the urethra towards the anus, or when the complaint is complicated with chordee. See Chordee.

The viscid transparent fluid which is naturally secreted by the glands of the urethra changes into a whitish aqueous liquor,
GONORRHEA.

Liquor, and the secretion which takes place from the lining of this canal, and is intended for its lubrication, also becomes less transparent. At length both these fluids, becoming thicker and thicker, gradually assume more and more the qualities of pus. The discharge often undergoes an alteration in its colour and consistence, a circumstance which Mr. Hunter imputed to the disposition of the parts by which the matter is formed. Sometimes it is white, sometimes yellow, sometimes of a greenish colour. Various species depend upon the diminution, or increase, of the inflammation, and not upon the poisonous quality of the matter; for the same appearances happen whenever the parts are irritated in a certain degree by any cause whatsoever, as several facts confirm. Dr. Swedaur injected into his urethra some caustic volatile alkali mixed with water, by way of experiment. The usual symptoms of a gonorrhœa ensued, together with a discharge which had the same appearances and alterations of colour, as the matter of the gonorrhœa virulentia. We have already stated that the same circumstances most frequently attend the employment of bougies.

In the generality of instances, the discharge does not proceed from any great extent of the urethra, not from more than an inch, or an inch and a half of that part of the passage, which is nearest the orifice in the glans penis. This distance was what Mr. Hunter used to name the specific extent of the inflammation. Before this celebrated surgeon flourished, it was commonly supposed, that the matter came from the whole of the urethra, and even from Cowper's glands, the prostatic, and the vesiculae seminales. Due attention to the symptoms, however, makes this idea seem quite improbable. If, for example, every part of the urethra, beyond the bulb, or if the bulb itself contributed to the discharge, the matter would be propelled out of the passage in the same manner as the semen, that is to say, by a sudden convulsive kind of action. It is well known that nothing can lodge in the bulb of the urethra, without immediately putting that part of the canal into action, particularly when in a state of irritation and inflammation. A drop of urine is not allowed to remain there, and if simple warm water be injected thus far, it is instantly forced out by the action of the acceleratores urinaris muscles. Therefore it seems rational to conclude, that if the membranous and bulbous parts of the urethra, Cowper's glands, the prostatic, and the vesiculae seminales, all had a share in forming the matter, no sooner would a certain quantity have collected in the bulb, than an immediate expulsion would be occasioned by the muscles of the part. No symptom of this kind, however, is usually observed, although it occasionally happens, that the acceleratores urinaris are affected with spasmatic contractions, which are particularly disposed to occur just after the patient has been making water, and do not seem to have any dependence on the discharge.

Mr. Hunter has taken notice that when the inflammation is violent, some of the vessels of the urethra often give way. Hence a hemorrhage arises, which is most profuse, just after the patient makes water, though it also continues at other times. Sometimes the blood is inconceivable in quantity, and only just sufficient to give a red colour to the matter. The emotions, which are so frequent in this complaint, are apt to occasion an extravasation of blood, a symptom which is always attended with an increase of the pain felt at the time of making water, but the bleeding always in the end lessens the inflammation, and tends to the relief of the part.

The inflammation, accompanying a gonorrhœa, is attended with several of the characters of common inflammation; but yet it differs also from the latter affection in many respects. It does not excite any pulvatory sensation; it causes little pain, except what arises from the irritation of the urine and the tension of the parts; and the inflammatory irritation seldom extends beyond the affected surfaces. The reason of so large a quantity of pus being secreted, in consequence of so moderate an inflammation, has been attributed to the parts being such as naturally secrete, so that they readily alter the natural into a morbid secretion.

Although the inflammation of a gonorrhœa is commonly moderate, there are instances in which it is exceedingly severe, and extends into the reticular texture of the surrounding corpus spongiosum urethra, particularly of that which is near the glans penis. Sometimes the inflammation advances further along the corpus spongiosum, and occasions a swelling, or extravasation of coagulating lymph, which is the cause of choree. We have already stated that the inflammation occasionally gives rise to abscesses of the glands of the urethra, particularly of those in the perineum.

It is not decidedly known in what manner the disease communicates itself to the urethra. Some suppose that the inflammation creeps from the glans penis to the edges of the orifice of the urethra, and thence further into the passage. These reasoners will not allow the probability of a common opinion, that some of the infectious matter gets into the urethra at the time of coition. At all events it seems clear, that none of the contaminating fluid can get as far as the diseaee extends in ordinary instances, much less in others, where the affection reaches a great way towards the bladder. There are some facts which tend to prove that the simple application of the infectious matter to the end of the penis may give rise to a gonorrhœa. A case related by Mr. Hunter in his treatise on the venereal disease, seems to confirm the truth of what we have mentioned.

As we have already observed, the complaint seldom extends further along the urethra, than about an inch and a half, or two inches. Mr. Hunter thought, that this part of the canal appeared to be most susceptible of the particular kind of inflammation brought on by the infection, and it constituted, what he used to term, the specific distance of the disorder. However, neither the fatigues of which the patient complains, nor the irritation of the parts, are confined to the real seat of the disease. The neighbouring parts are often affected with a variety of symptoms, of a nature more or less severe, such as uneasiness, and even pains every where about the pubes, scrotum, perineum, anus, and lips. It is often necessary to subdue the teaticles, which become so irritable, that the least accident, or exertion, which, in other circumstances, would have no effect, makes them swell. It frequently happens that the glands in the groin are sympathetically affected; they swell and inflame, though they do not commonly suppurate. Cysts also occur in which the irritation extends to the buttocks, thighs, and abdominal muscles, occasioning acute pain, swelling, and extreme forenoon of the parts, and putting the patient under the necessity of always continuing in an horizontal posture. These symptoms, however, are not strictly inflammatory; if the patient be bled, his blood does not exhibit the inflammatory crust, and the constitution is little or not at all affected.

When the case, independently of the affections arising from sympathy, is not more violent than what has been described, it is called a common gonorrhœa; but the violence of the effential symptoms of the disease will be more or less considerable, according as the patient is more or less susceptible of such complaints as depend upon irritation. Thus, in particular habits, the inflammation does not con-
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fine itself to the specific distance, but reaches all along the urethra. Severe pain is also frequently experienced in the perineum. Sometimes the accelerators urinæ muscles are affected with the spasm-like contractions, of which some mention has already been made. Such spasm is particularly apt to come on when the patient has just finished making water; it flows itself by the manner in which the last drops of urine are expelled; and it is generally attended with contractions of the erectile muscles. Sometimes the inflammation is so great as to occasion a swelling, and even an abscess in the cellular membrane. It has already been observed, that the most common situation of such suppuration is in Cowper’s glands; but the small glands of the bulb may also be affected in a similar manner, and the irritation, in certain instances, is found to extend even to the bladder itself.

When the latter organ is once affected, it becomes more susceptible of every kind of irritation, so that very distasteful complaints are apt to be produced. It is no longer capable of bearing the degree of dilatation of which it is capable in the healthy state. Hence the patient cannot hold his water in the usual way; but no sooner does the inclination to discharge it arise, than he is immediately compelled to make the evacuation, notwithstanding the severe pain, which, while the urine is escaping, is felt in the bladder, and especially about the glans penis. This pain has been compared with what is experienced in a fit of the stone, and it lasts for some time after the evacuation is completed.

The ureters, and even the kidneys, are sometimes sympathetically affected, when the bladder is considerably inflamed or irritated. Such an occurrence, however, is exceedingly uncommon. Mr. Hunter mentions his having seen an inflammation of the peritoneum brought on by a severe affection of the bladder in gonorrhoea; and others have observed a violent inflammation of the kidneys from the same cause. (See Encyclopædia Méthodique partie Chirurgicale, tom. 1. p. 584.) It has already been mentioned that a chordee is one of the occasional effects of a gonorrhœa. It arises in general from inflammation; but in some cases it appears to be entirely of a spasm-like nature.

When the inflammation is not confined to the urethra and its glands, but spreads further, it attacks the substance of the corpus spongiosum, where it occasions an extravasation of coagulating lymph, which, uniting the cells together, makes the urethra incapable of yielding and being filled with the same degree as the corpus cavernosum. Hence, during an erection, the penis becomes bent forward. The adhesion of the cells of the corpus spongiosum urethra together, which is the cause of chordee, in general, comes on in consequence of mere inflammation of the canal; but occasionally it is the effect of a species of inflammation, which is seen accompanying certain ill-conditioned chancres. A chordee often continues after all the other symptoms of a gonorrhœa have quite ceased.

A chordee is sometimes altogether spasmic, in which case it is seen to disappear and re-appear alternately, at indeterminate intervals. At one time the erections, which are so common in cases of gonorrhœa, happen without being attended with any curvature of the part; while at other periods the chordee takes place in a great degree; the intervals of time between these changes being sometimes remarkably short.

A swelling of the testicles is a frequent consequence of a gonorrhœa. It may happen in any stage of the disease; but, perhaps, it takes place most frequently when the complaint is on the decline. It was considered by Mr. Hunter as an affection arising from sympathy. It is seen attending any kind of irritation in the urethra, whether occasioned by injections, bougies, or any other circumstance. In many cases, the swelling comes on and disappears very suddenly, or seems to leave one testicle to attack the other.

The swelling of the testicle generally begins with a soft, pulpy tumefaction of its glandular part, which becomes rather painful when handled. The tumour afterwards increases in size and firmness, and produces considerable pain. The inflammation seldom ends in suppuration, though some instances of this kind are met with. The epididymis (especially its lower end) is usually the hardest part; but, frequently, the induration and swelling attack the whole of the epididymis, and form a sort of knot at its upper part. The spermatic chord also is often affected, especially the vas deferens, which is thickened, and exceedingly tender. Sometimes the veins of the testicles are varicose.

The inflammation of the testicle, as well as that of the urethra, is frequently attended with sympathetic symptoms of irritation in other parts; for instance, pain at the lower end of the spine, a sense of weakness in the loins, colic pains, nausæa, flatulence, disorder of the digestive organs, &c.

The swelling of the testicle is noticed to take place remarkably often just when the pain in the urethra has subsided, and the discharge has flopped; or else the truth is, that on the testicle becoming affected, the symptoms of irritation in the urethra immediately cease. Here it is somewhat difficult to determine which is the cause, and which the effect. However, it is worthy of remark, that it is not uncommon for the testicle to begin to swell at the very moment when the inflammation of the urethra, and the discharge, are becoming worse. Sometimes the epididymis alone is affected; sometimes only the vas deferens; and, on other occasions, only the spermatic chord. No reason can be assigned, why one of these parts should be affected rather than the rest. The inflammation of these organs is frequently attended with a strangury, especially when the discharge is suppured; and, indeed, it is remarked, that the flopping of the running generally brings on a tendency of that distressing complaint.

Another occasional effect of a gonorrhœa is a swelling of the lymphatic glands in the groin, a symptom, which is of the same nature as the inflammation of the testicle, but much more common. It has been supposed that the tumefaction of the glands depends on the absorption of some of the matter from the urethra; but Mr. Hunter contended against this opinion. He thought that, in gonorrhœa, the matter was seldom absorbed, and he derived this sentiment partly from seeing that a hue venerea was seldom the consequence of this disease. However, this argument will have no weight with those practitioners, who disbelieve in the doctrine that the poisons of gonorrhœa and the venerial disease are of the same nature. Another consideration, which influenced Mr. Hunter, will meet with more general approbation. It was the fact, that any simple mechanical irritation of irritable organs is capable of exciting an inflammation in theirabsorptions, and of the glands to which such excites run. Now, since the lymphatic and their glands usually inflame before suppuration has taken place in the part originally affected, and their inflammation often subsides as soon as this last occurrence begins, we must conclude, that the swelling of the inguinal glands, in gonorrhœa, arises altogether from the irritation in the urethra. It is observed also, that such swellings almost always admit of resolution, while those which originate from the absorption of venereal matter from chancres very frequently suppurate, burst, and turn into suppurative ulcers. It is true, however, that swellings of the inguinal glands, induced by the irritation of gonorrhœa,
do sometimes end in abscesses and fowes; but no lues venerea follows, nor is mercury requisite for the cure.

Another sympathetic affection, sometimes attendant on a clap, is a swelling of the absorbent vessels themselves. In some instances, this symptom accompanies the swelling of the glands. It makes its appearance in the form of a hard, painless cord, which, proceeding from the prepuce, extends along the dorsum of the penis, sometimes as far as the groins. This effect is not the consequence of the absorption of matter; for it is seen attending other irritations in the urethra, where no supposition of any irritating or poisonous matter being taken up by the lymphatics can be entertained by any kind of reasoning whatsoever. The symptom is sometimes brought on by the employment of bougies, in the treatment of strictures. It was for a long while suppos'd, that the matter which is discharged from the urethra, in cases of gonorrhea, was furnished from ulcers in this canal; but observation at length detected, that the opinion was delusive of all foundation. Dr. William Hunter is reputed to have been the first who ascertained, that in gonorrhca no ulcers existed in the urethra, and he is said to have begun to inculcate the fact in his lectures about the year 1750. This celebrated physician had derived his sentiment from some particular cases which he had seen, where a large quantity of pus had been formed upon the surface of the ulcer, without any ulceration of the parts whatsoever. In 1761, his brother, Mr. John Hunter, had an opportunity of dissecting the bodies of two mulattoes, who were executed, it is said, that they were affected with a severe gonorrhca. After a most careful examination, no ulceration could be discovered: the urethra of each was merely found to be rather redder than natural, particularly near the glans penis. Mr. Hunter afterwards opened the urethra of many patients who had died with gonorrhca upon them, and he never could find any vestiges of ulceration. It constantly appeared, that the membranous lining of the canal, near the glans penis, was redder than usual, and that the lacune were frequently filled with pus. Morgagni is said to have remarked the same fact. (De Sedibus et Caussis Morborum. Epit. 44, § 7.)

As an attempt has been made by a late writer, Dr. Swedman, to transfer the honour of the discovery from the Hunter to Morgagni, we deem it our duty to observe, that we cannot discover any accuracy, or justice, in the doctor's statement, since Morgagni's work was not published till 1761.

Although there can now remain no doubt, that in gonorrhca there are no ulcers essentially, or commonly present in the urethra, to furnish the matter which is discharged, yet Mr. Hunter himself has explained, that a very occasional by the cutting of an abscess in one of the glands of this package, is sometimes produced. This kind of ulceration, however, never takes place till long after the commencement of the running, and it is quite of a different nature from such cases as were fancied to be the cause of gonorrhca.

We shall now consider the identity of the gonorrhca and venereal poisons. It has been represented by some surgical authors, that the essential difference between gonorrhca and the venereal disease depends upon the circumstance of the first complaint being an affection of a secreting surface. Many other writers, and we may add, the generality of enlightened practitioners in this country, contend, that the two diseases originate from different poisons, a sentiment which is supported by the striking dissimilarity of the two affections, and the wide difference of the modes of cure.

Such authors, as maintain the doctrine of the two complaints being the consequence of different distinct poisons, found their arguments upon various circumstances. First, the history of these diseases, and of their progress in different countries. Secondly, the phenomena peculiar to each disorder. Thirdly, the remedies necessary for the cure.

It is ascertained, that the venereal disease and gonorrhca did not make their appearance in Europe at the same period; but that the former was many years antecedent to the latter. The same thing is stated to have happened in other parts of the world,whether Europeans have conveyed the venereal virus. For instance, the venereal disease was known in China almost immediately after it had made its appearance in Europe; yet it is remarked by Alfreu, that at the time when he wrote, gonorrhca was a malady which had only been very recently observed among the Chinese. Also, in the South-sea islands, discovered in modern times, where both the venereal disease and gonorrhca were unknown before the landing of European navigators, but where these maladies were afterwards diffused, gonorrhca was not noticed till several years after syphilitic disorders had begun to shew themselves. Claps are said to have been yet unknown to the natives of the South-sea islands, at the period when Captain Cook was performing his second voyage. (Duncan's Medical Cases and Observations.) All these circumstances have been adduced to prove the difference between that virus which gives rise to the venereal disease, and that from which gonorrhca has its origin.

On the circumstances attending the commencement of the venereal disease, in these remote countries, led Mr. Hunter to draw a conclusion diametrically opposite to the one deduced by the foregoing chefs de raison; for, he observes, that it is almost impossible for a man to have a chancre during a voyage of several months, without the whole of the penis being destroyed, while it is well known, that a gonorrhca may last an immense time, without losing the character of being virulent. It is related in the account of captain Cook's voyage, that the inhabitants of Otaheite, who were infected with the gonorrhca, went up the country and got well; but that when the consequence of the malady was the venereal disease, the latter was incurable. Hence it is inferred, that the complaint which the Otaheites contracted was the gonorrhca, since chancres and venereal affections would never have yielded to the simple means which were adopted. Besides, if the disorder had consisted of chancres, and the natives of Otaheite had been acquainted with the mode of curing such fowes, it is contended, that they could likewise have understood and been cured of the venereal symptoms. We find, also, from the perusal of captain Cook's third voyage, that the venereal diseases afterwards raged in all its forms in the island of Otaheite. Now, since there is no document to shew, that the gonorrhca was again introduced into that country, subsequently to Cook's second visit, it is concluded, that every form of the venereal disease which has been observed there has been derived from one source, which, in all probability, was a gonorrhca.

Mr. Hunter mentions a gentleman who had a gonorrhca threc, of which he was cured without mercury. About two months after each infection, he had symptoms of lues venerea. The first were ulcers in the throat; the second were blisters on the skin; both which forms of the disease yielded to mercury. Thirlby, two punctures were made on the penis, with a lancet dipped in the matter of a gonorrhca. One of these produced, on the part of the prepuce where it was made, a red, thickened speck, which increased and discharged some matter. This suppo'd chancre healed on having its surface repeatedly destroyed by cautery. The other puncture was made on the glans, where it was followed by
by a pimple, full of yellowish matter. This pimple was
touched with caustic, and healed in the same way as the fore
on the prepuce. Four months afterwards the chancre on
the prepuce broke out again; then it healed, and returned.
This it did several times; but always healed without any
application to it. While the fores remained on the prepuce
and glans, a bubo formed in the groin. A sufficient quan-
tity of mercury was given to cure the gland locally, but not
to prevent the affection from spreading. Two months
after the cure of the bubo, a venereal ulcer, according to
Mr. Hunter, formed on one of the tonsils. This was cured
by mercury; but the medicine was purposely left off as soon
as the fores was trimmed over, in order to see what parts
would next be affected.

About three months afterwards, copper-coloured blots
made their appearance in the skin, and the ulcer on the
tonsil recurred. This disease was again only palliated by
mercury; but the complaints returned in the same situation
as before; and were ultimately cured by a proper quantity
of mercury.

On the other hand, doubts must exist, concerning this ac-
count of the matter of gonorrhoea, when the following cir-
cumstances are taken into consideration:

16. It is impossible to say what time may elapse between
the application of venereal poison to the penis, and the com-
 mencement of ulceration. Therefore, Bongainville’s failurs,
alluded to by Mr. Hunter, might have contracted the infec-
tion at Rio de la Plata; but actual ulcers on the penis
might not have formed till about five months afterwards,
when the ship arrived at Otaheite. 2dly. The second ar-
gument added by Mr. Hunter is certainly inconclusive.
Every ulcer in the throat is not regularly venereal. A
common ulcer may heal while the patient is using mercury.
Hence the cure, apparently accomplished by this medicine,
is no proof that the complaint was syphilitic. 3dly. The
last fact of inoculation is undoubtedly very strong. But,
though the infection of gonorrhoeal matter, or any other
morbid matter, beneath the cuticle, will undoubtedly pro-
duce troublesome local complaints, may we not doubt that
the fores, in the above case, were actually venereal ones?
Can we implicitly depend on the continuance of the subject
of the above remarkable experiments, during the long space
of four months, between the healing of the sore on the prepuce,
and its recurrence? If we cannot, the inference, in regard to
the power of gonorrhoeal matter to communicate the venereal
disease remains unsubstantiated. How much more conclusive
in this respect, the experiments would have been, had the
inoculation been practiced on any other part but the penis.
If the matter of gonorrhoea be capable of communicating
the venereal disease, why does not the discharge commonly
produce chancres on the glans and prepuce, with which parts
it must lie in contact a very considerable time in every
case? Why also does not the presence of a chancre fre-
cquently cause a gonorrhoea? If the infection of gonorrhoeas,
and the venereal disease, be really of the same identical
nature, certainly, it seems very extraordinary, that the
former complaint should receive no benefit from mercury,
and the latter disease invariably require this specific re-
medy.

With respect to the venereal disease and gonorrhoea having
arisen in Europe and elsewhere at different periods, it has
been observed by such writers, as incline to the belief in
the identity of the virus of the two affections, that every kind
of contagious disease appears with greater violence in new-
infect ed countries, than in other situations where it has been
a considerable time endemic. In this manner, an endeavour,
which, in our opinion, is quite unsuccessful, is made to ex-
plain the cause why the gonorrhoea generally did not make
its appearance till a long while after the venereal disease had
swen itself in much worse shapes. The fame class of
reasoners also assert, that, notwithstanding the diligent en-
quiries of many able men, there is still a degree of doubt
concerning the exact time when these diseases originated,
and, of course, concerning the point, whether one of them
actually existed a long while before the other. As we shall
have occasion to allude to the origin of the venereal disease
hereafter (see Laca Venerea), we shall not enter into this
dilution in the present article. We may be per-
mitted, however, to express our suspicions, that discharges
from the urethra must have been occasional discharges from
time immemorial. Whether there be a species of gonorrhoea
truly venereal, that is to say, one which depends upon the
same virus, as syphilis, there may for ever remain doubts;
but, that there are laps or discharges which arise from
no poiso nous or infectious matter whatsoever, but altogether
from mere irritation in the urethra, as, in certain cases of
strictures, is certain and undisputed. These gonorrhoeas
must have prevailed as long as that canal has been liable to
various kinds of irritation.

One argument advanced against the identity of the virus,
and the striking difference observable in the progress and symp-
toms of the two diseases, is, that thevenereal disease is
deficient, it always grows worse and worse, and sooner or later brings on the patient’s dissolu-
tion. On the contrary, a gonorrhoea tends to a natural cure, and,
though left to itself, commonly ends in a favourable way.

The advocates for the identity of the poisons, however,
contend, that, in order to account for this full last (which
they state is not without exceptions), it is by no means
necessary to suppose a different virus. They bring into
consideration the circumstance of gonorrhoea depending upon
an inflammation of the surface of the urethra, and not ulcer-
ation; and they maintain, that the absorption of the
venereal poison generally happens much more easily from
ulcerated surfaces, than from such as are simply inflamed.
This mode of reasoning is brought forward as explanatory of
the cause why, in the majority of cases, a gonorrhoea re-
 mains entirely a local complaint, and admits of a spontaneous
cure, while the venereal disease is always prone to extend
itself, and spread from one part of the body to another.

An argument against the identity of the virus is also
 founded on the reflection, that the venereal disease is only
capable of communicating the venereal disease, and gonor-
rhoea of imparting gonorrhoea. The partisans of the de-
cline which imputes this latter affection to the venereal
disease, acknowledge, that things do usually correspond with
the statement just now given; but they assert, that the
contrary case is also frequently observed. They remark,
that we may easily convince ourselves of this circumstance,
by a fact which is well known to practitioners, namely,
that when persons, who have a gonorrhoea, are not parti-
cularly careful to keep the glans and prepuce clean, chan-
cres are very apt to form upon these parts, and by one such
factor the whole system may become infected. It is also
asserted, that, independently of the formation of any chan-
cre, there are cases proving, that the venereal disease may be the
consequence of a gonorrhoea, and that every surgeron of ex-
tensive practice must meet with instances of this kind.
One of the most remarkable on record, is that related by Mr.
Hunter; and it has been already noticed by us in this
present article, we need not dwell upon it again.

With respect to chancre arising from the matter of
gonorrhoea being in contact with the glans and prepuce,
we do, undoubtedly, see both men and women who have

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claps and chances together; but, in our opinion, it is most
rational to impute the fores to the application of venereal
pox from chances, together with the gonorrhoeal matter,
at the time of coition. We have no doubt that this act is
often performed, when, between the two parties, both kinds
of infection are present.

Certainly it seems extraordinary, that if the virus be of
the same nature in both cases, the two effects should not always
appear in the same patient. We ought naturally to expect,
that when a gonorrhoea makes its appearance first, it would
always be the causie of a chancre; and that when a chancre
is the first symptom, it would invariably be the occasion of
gonorrhoea. We diffnus from prior consideration the
infection of such writers as defended the identity of the virus,
that in some few instances, one malady does become the
cause of the other. Mr. Hunter suspected, that the irratio-
ation of one of the parts, forming the face of the two dif-
cases, became the preparative of the other. He thought,
that when the urethra inflames and discharges matter, the
adjacent external parts might, on that very account, be
exempt from a disease which they otherwise inevitably
contract, by reason of the effect of the very virus which
gave rise to the gonorrhoea. The fame celebrated writer
also entertained a suspicion, that when a chancre attacks
the glass, or prepuce, the urethra might become ineffec-
tible of the irritation, which, without the external disease,
would certainly lead to a discharge from that canal.

This mode of explanation appears to us somewhat theo-
retical. We are of opinion, also, that in arguing in this way,
the advocates for the identity of the virus only bring for-
ward the shadow, instead of the substance of reason. In fact,
they say nothing more than that supposed venereal matter
cannot make the external parts of the penis ulcerate, because
there is an irritation in the urethra; and that the urethra
cannot be affected with gonorrhoea, because a chancre already
occupies the external parts. If this reasoning be not hypo-
thetical and fanciful, we cannot conceive what arguments
can ever be considered for. They who talk in this manner,
inaudently fall into difficulties, and make one opinion
inconsistent with another. Thus, they have already told us,
that, occasionally, a chancre is apt to occur, when patients
with gonorrhoea neglect to keep the glass and prepuce
clean; yet, according to their principles, a chancre renders
the external parts incapacitated of infection, and, of course,
there would be no need of cleanliness as a preparative. We
think that the weakness of the argument must be obvious to
the young student, who, on his entrance into any venereal
ward of an hospital, is almost Sure of immediately finding a
patient who has at the same time both chances and go-
orrhoea.

The different treatment required by gonorrhoea and the
venereal disease, is another argument against the identity of the
virus, mercury being unnecessary in claps, and the same
applicable in the other complaint. The partisans of the oppo-
site opinion endeavour to diminish the force of this fact, by
adverting to the different ways in which the two diseases
affect the parts which are attacked, and by manifesting that:
no just inference can be drawn from the difference of treat-
ment, while the particular action of mercury, on various
parts affected with the venereal poison, is not understood.
They also contend that, though mercury may have no effect
in gonorrhoea, when used in the same way as for other ven-
eral affection, yet, when applied to the urethra itself, it
leaves to moderate the symptoms, and accelerate the cure.

Having seen the colored injection employed in so many
hundreds of cases, with less benefit than the common vitriolic
one, we cannot ascribe to the last obsevation. The other
remarks, being bare opinions, may be received or not, as
the judgment of the reader may incline him; but, for our
own part, we have no hesitation in refusing them a place
among such information as is founded on rational evidence.

We shall now say a few words, respecting the time, be-
tween the application of the infection and the beginning of its
effects.

In the greater number of diseases, a certain space of time
always elapses between the application of the causie and the
first appearance of the effect. The time when a gonorrhoea
begins, after contamination, varies considerably in different
cases. In some examples, the poison takes effect in a few
hours, as Mr. Hunter has seen two or three times; while,
in other instances, the complaint does not show itself till the
end of five or six weeks. There are also cases to be met
with, in which the disorder begins at all the intermediate
periods. It is calculated, that the most common time of
its origin is in the space between the sixth and twelfth day.
In one instance, in which the malady did not commence till
the end of six weeks, it was noticed by Mr. Hunter, that
the affection was preceded by various symptoms of irrita-
tion, and uncommon sensation, in the parts. Hence, this
celebrated author concluded, that the virus seldom, or never,
remains so long inactive; but that the inflammatory state
cannot exist a good while before suppuration takes place.
The delay in the commencement of the discharge, however,
may be owing to causes which are not understood, and this
is very likely to be true, if we consider that some cases of
gonorrhoea do not begin for five or six weeks after infection,
and yet are not preceded by any remarkable symptom what-
ever.

The observations already made in a preceding part of this
article, must have apprized the reader, that discharges from
the urethra may originate from more causes than one, and
from more irritations than that which is produced by one
particular kind of virus. There are sometimes spontaneous
discharges from this passage, while no immediate cause what-
ever is assignable. Such discharges as occur independently
of a specific gonorrhoeal, or, according to the Hunterian
doctrine, the venereal virus, have been termed factor or be-
ign. Some affeet, that these cases may be known by their
coming on immediately after coition, and it is violent from the
very beginning: while the virulent gonorrhoea does not
commence till after some days, and grows gradually worse.
However, this criterion is insufficient: simple gonorrhoeas
are not always owing to coition, nor are they alwayssudden
in their appearance.

Mr. Hunter has seen the urethra sympathize with the
gums in dentition, and all the symptoms of gonorrhoea affect
the same infant several times. The author of the article
Gonorhœa, in the Encyclopaedia Méthodique, also mentions
his having seen two female children, who were affected
during dentition with a discharge from the pudenda, attend-
ed by a certain degree of inflammation, and pain in making
water.

We shall next introduce a few remarks on the effect of the
discharge on the parts producing it.

It was formerly not an uncommon opinion, that the dis-
charge was a means employed by nature for carrying off the
virus occasioning the complaint, and thus bringing about a
cure. However, it is impossible for this to be true, with
respect to inflammations, which arise from a specific virus;
for, supposing the suppuration could wash away all the
poison, causing the original irritation, yet, as all the mat-
ter afterwards secreted is equally virulent, no good would
be done: the irritation, according to the preceding idea,
would be perpetuated, and, of course, the discharge. This

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eral occurrence, however, we need hardly remark, is not the case. The affection of the urethra in gonorrhoea is not kept up by the matter, but by the specific quality of the inflammation itself, which, in all probability, can never continue beyond a limited time, since the symptoms at length spontaneously subside. Had the infectious matter, which is formed in the course of the disease, the power of protracting the original irritation, the disorder would have no termination.

In gonorrhoea, as in many other diseases, the morbid action of the parts affected cannot go on for a long while in the same way. After having increased in violence to a certain degree, it naturally tends to become weaker; and the symptoms of the disorder which depend upon such action, at length, entirely subside. The time of this ceffation will vary according to circumstances; for if the irritated parts be very susceptible of the specific irritation, the diseased action must be more violent and lasting; but, in all cases, this difference is always owing to some particularity of constitution and not to any peculiarity of the virus.

The reader is aware that Mr. John Hunter regarded the gonorrhoea as one form of the venereal disease. It was the opinion of this distinguished man, that the venereal disease was only capable of a natural cessation, when it occupied a secreting surface, from which it produced pus. He believed that when the part attacked was not a secreting one, and an ulcer was formed, the disease would of itself go on for ever. He referred this difference between gonorrhoea and a chancre, however, more to the difference in the mode of action, than to that of the affected surfaces; for when the venereal virus produces an ulcer upon a secreting surface, as it sometimes does upon the tonsils, and even the urethra itself, such forces are not more disposed to heal, than if they were situated any where else in the body.

It is sometimes observed, in cases of gonorrhoea, that the parts which were irritated irritated well, while the irritation is communicated to another part of the same surface, as happens, when it leaves the urethra near the glans, and affects that part of the canal which is further on towards the bladder.

Admitting that every gonorrhoea is capable of getting well, without surgical assistance, it may be doubted whether a person, who already has a gonorrhoea, is susceptible of the irritation of fresh gonorrhoeal matter, or that the clap which exists could be augmented by its application. Mr. Hunter extended the same observation to every form of the venereal disease; and he states, that the matter of gonorrhoea, or of a chancre, put on an ulcerated bubo, does not in the least retard the cure, although, if venereal matter be applied to a common fore, the venereal irritation will frequently be excited. Such facts are strongly in favour of the opinion, that the matter of gonorrhoea has no effect in keeping up the complaint. The urethra is neither irritated by the infectious matter which it secretes, nor can the irritation already existing last beyond a certain period. Even were fresh matter applied to the urethra, the complaint would probably get well with equal quickness.

Mr. Hunter extended the idea farther, and even conceived that a fresh gonorrhoea could not be contracted, were fresh virus applied to the parts affected, at the period when the cure was just on the point of being completed. He thought that, in time, the parts might be so habituated to the impression of the virus, as to become insensible of it, and they must have regained their natural and original state, ere the infection can again have such effect upon them as to reproduce the complaint.

The foregoing opinions do not rest altogether upon theory; they are also founded upon experience and observation. Men, who have just had a gonorrhoea, have frequently been known to expose themselves to be infected again without any recurrence of the complaint taking place, while other healthy persons, who had connection with the same woman, have immediately caught the malady. Perhaps, it is on the same principle, that the first gonorrhoea is generally the most violent, and that such persons as are often affected with claps have them more and more mildly, particularly when the intervals are short.

In corroboration of these sentiments, Mr. Hunter relates several cases, among which is the following: a married man, who, for several years, had had no connection with any woman except his own wife, happened to meet with an old acquaintance, who gave him a severe gonorrhoea, though he declared her belief that she was quite well. Both adopted some means of cure; but continued to cohabit together during the treatment. The man got well, and it was presumed that the woman was also cured. They continued to live together several months; without the former experiencing any inconvenience, or having any reason to suppose that there was still any thing the matter with the latter. At length they parted, and the woman formed a new attachment. She had no sooner made this last connection, than she gave the new lover a gonorrhoea. She again consulted Mr. Hunter, whom she assured, that she had never cohabited with any others, except the preceding two; and consequently, if this be true, the infection of her first lover must have arisen from the very same gonorrhoea, of which she supposed that she had been formerly cured. However, she now used no remedies, and the man, after he was well, continued to cohabit with her for several months without receiving any new infection. But her old lover now returning, after a year's absence, and thinking that, as she was living regularly with the second, there could be no danger, ventured to have connection with her; the consequence was, that he caught another gonorrhoea.

Before describing the treatment, it is proper to lay a few words of the disease in women.

The gonorrhoea in females is not so complicated as in men, the parts affected being more simple and fewer in number. In women the disease is not so easy to be arrested, because they are also liable to a complaint, called the florid album, which has some resemblance. A mere running from the parts is not to much a proof of the existence of an infectious gonorrhoea in a woman, as a discharge without pain in a man; and in the former the discharge will often exit, while there is no increase whatever in the natural secretion from the parts. Nor can any criterion be deduced from the kind of matter, since the discharge of the florid album does not always cause the appearance of the discharge and the complaint in women. Mr. Hunter also remarks, that the appearance of the parts often gives us but little information, for he frequently examined them in patients, who complained of all the usual symptoms, from an increased discharge, pain in making water, a tendency to evil-smelling discharge, and yet he could find no difference in the look of the parts and of such as are quite healthy. When the patient was not conscious of any particular symptoms, or was disposed to conceal her knowledge of them, Mr. Hunter thought that some judgment might be formed from her having had connection with men supposed to be infected, and from her power of communicating the disease to others. However, it is acknowledged,
acknowledged, that as this last circumstance is derived from the testimony of another person, there are obvious reasons why it should not always be trusted.

When a woman contracts a gonorrhœa, the vagina must be first attacked. a part which is not ended with considerable facility. Frequently, however, the complaint extends much further, producing disagreeable fevers and forebodings of the inside of the labia, hymenæus, clitoris, carunculae myrtiformes, and means urinaris. The parts are sometimes so sore that the patient cannot bear them to be touched; she can hardly walk; and a great deal of pain is experienced when the urine comes into contact with the sore surfaces, as it must unavoidably do as often as the bladder is emptied.

When the disease extends to parts which are more sensible than the vagina, and more susceptible of inflammation, women have nearly the same symptoms as men; a fullness about the parts, a discharge from the urethra, violent pain in making water, and great uneasiness from the pressure on the parts in sitting. Sometimes the bladder is also affected.

The inflammation frequently extends to some depth, running along the ducts of the glands, and affecting the glands themselves, so as to occasion hard swellings under the surface of the inside of the labia. These tumours often spontaneus, and burst near the orifice of the vagina. They resemble the abscesses in the glands of the urethra in men.

The time in which a gonorrhœa may be cured is exceedingly variable, some cases terminating in a week, while others continue for months under the same treatment. According to Mr. Hunter, the object in the cure is to destroy the disposition and specific mode of action in the solids of the parts, and, as soon as that change is accomplished, the poisonous quality of the matter produced will also be destroyed. Thus the disease may be cured though not always its consequences.

A gonorrhœa is not capable of being continued beyond a certain time in any constitution, and when the complaint is violent and lasts a long while, it is owing to the parts being very susceptible of such irritation, and readily retaining it.

Since there is no specific medicine for the gonorrhœa, it is very fortunate, as Mr. Hunter observes, that time alone will effect a cure. This celebrated surgeoine was inclined to think, that, in cases of gonorrhœa, medicines were seldom of service, perhaps not more frequently than once in ten instances. With the idea, that every gonorrhœa cures itself, he gave certain, patients pills of bread, which were taken with great regularity. These pills all got well; but Mr. Hunter thought that some of them were not cured quite so fast as they would have been, had artificial means been employed.

The surgical methods of cure consist of internal remedies and local applications; but in putting any plan of treatment in execution, more attention should always be paid to the nature of the constitution, or to any attending disease in the parts themselves, or parts connected with them, than to the running itself.

The nature of the constitution is principally to be judged of from the local effects of the disease. These are so different in different people as to require a great variety of treatment, a circumstance, says Mr. Hunter, which has been too little attended to, every one endeavouring to attack the immediate symptoms, as if he had a specific for a gonorrhœa.

We are to consider, whether the inflammation is violent or mild, common or irritable. When the symptoms are violent, but of the common inflammatory kind, which is to be judged of from the attending circumstances, and particularly from the extent of the inflammation not exceeding the specific disease, the local applications may be either of the irritating or soothing kind. In this example, irritating applications may be left dangerous, than when the inflammation is of the irritable sort, and may have the effect of altering the specific action, the parts afterwards recovering of themselves, as from any other common inflammation. Mr. Hunter, however, expresses his belief, that the soothing plan is the best at the beginning.

When the inflammation is great, and of the irritable kind, no violence is to be used in the treatment, as the symptoms would thus only be increased. Mr. Hunter thought, indeed, that there were some cases, which are exceptions to the latter remark, the great degree of inflammation arising entirely from a susceptibility of this irritation, and not from any general irritability in the constitution. He confesses, however, that such examples can seldom be discriminated.

When the symptoms run very high, nothing should be done to stop the discharge, as, were it to be checked, the inflammation would still continue, and no good be effected.

Mr. Hunter recommends us to alter the constitution, if possible, by remedies adapted to each disposition, with a view to alter the actions of the parts arising from such dispositions, and reduce the disease to its simple form. If the constitution cannot be altered, we can only allow the action to wear itself out.

When the inflammation has considerably abated, and the disease only remains in a mild form, its cure may be attempted either by internal remedies, or local applications. If local means are used, violence is still to be avoided, because it may bring back the irritation. At this period (continues Mr. Hunter), gentle astringents may be applied with a prospect of success; or, if the disease has begun mildly, and there are no signs of an inflammatory disposition, either of the common, or irritable kind, an irritating injection may be used, in order to get rid of the specific mode of action quickly. Such application will increase the symptoms for a time; but, when it is left off, they will frequently abate, or wholly disappear. In such a state of parts, astringents may be used for the only thing to be done, is to procure a cessation of the discharge, which is now the principal feature.

When the itching, pain, &c., are felt for some time before the discharge appears, Mr. Hunter rather prefers the footling to the irritating plan of treatment. He suspected, that thus the coming out of the discharge would be promoted, which occurrence he conceived was the first step towards a resolution of the irritation. He believed that, at all events, in this case, the employment of astringents would be bad practice, as, by preventing the discharge from taking place, they might prolong the inflammation, and protract the cure. Also, in cases of ulcers, and of disceded tinctures, he is adverse to the use of astringents; for, says he, while the discharge lasts, both the other complaints are relieved.

The internal remedies commonly recommended in a gonorrhœa, may be divided into evacuants and astringents. The evacuants (says Mr. Hunter), are principally of the purgative, or diuretic kind, and these are not confined to any particular medicine, every practitioner supposing that he is in possession of the best. Some use mercurial evacuants; whilst others carefully avoid mercury in every form. The neutral
neutral faults have been given from the idea of their being cooling. Some of the profession have chiefly kept to diuretics, perhaps with two views: first, as evacutaries acting mechanically upon the urinary passages, so as to wash away the matter; secondly, as specific. For this purpose, nitre has been given, a medicine which has always been thought to have great effect in lessening inflammation, though Mr. Hunter has doubts concerning the truth of the opinion. Under every mode of treatment the patients always get well, and the cures are ascribed by each practitioner to his own favourite method.

Mr. Hunter remarks, that "to keep the body open in most cases, even when the patient is in other respects in health, mull, no doubt, be proper; but what idea can we form of an irritation, produced all along the intestinal canal, curing a specific inflammation in the urethra? Yet there are cases where a brisk purge has been of service, and even in some has performed a cure. But I suspect, that, in such cases, the disease had been continued by habit only, and that this practice would not have succeeded in the beginning. A gentleman had a gonorrhœa, all the symptoms of which continued after the third and fourth days, when about two grains of belladonna, purged him most violently, he was immediately cured. The calomel could not have acted specifically, but by a kind of derivation, that is, an irritation produced in one part, cured one that subsisted in another; but even if it should be granted, that in some constitutions purges have the power of making the solids less susceptible of this irritation, it cannot be supposed they will have this effect in every case: in some constitutions, they might debilitate, increase irritability, and of course increase the symptoms. These contrary effects must take place in different constitutions, in which a medicine has no specific action. On the supposition of the cure being promoted by an evacuation from the blood, what service can purging out some of the blood, in the form of a secretion from one part, do to an inflammation of another part? On such a supposition would not a sweat, or an incrustation of the surface, by chewing tobacco, or stimulating the nose by snuff, all tend equally to cure a gonorrhœa? But humourus having been considered as the universal cause of every disease, especially those in which purgation had the effect of discharging poison, and purging having been supposed to be the cure for humourous putrid constipation, all of course made use of in this disease; and as the patients have always been cured, the practice became generally established.

Those who recommended mercury in this form of the disease, did it most probably from the opinion, that this medicine was specific for the venereal disease in all its forms. On this supposition, we can see some reason for their practice, as it would be absorbed from the intestines, circulate through the inflamed vessels of the urethra, and thereby destroy the venereal irritation. Here we can only suppose it to act by its specific virtue; but I doubt very much of mercury having any specific virtue in this species of disease; for I find, that it is as soon cured without mercury as with it; and where this medicine is only used as a purge, or purged off the next day, and therefore allowed to act merely upon the bowels, I cannot conceive that it could have any more effect upon the venereal inflammation in the urethra, than an irritation in the bowels arising from any other purgative. So little effect, indeed, has this medicine upon a gonorrhœa, that I have known a gonorrhœa take place whilst under a course of mercury sufficient for the cure of a chancre. Whether the gonorrhœa arose from the same infection that produced the chancre I cannot say; nor can it be easily determined in such cases. Men have also been known to contract a gonorrhœa when loaded with mercury for the cure of a venereal; the gonorrhœa, nevertheless, has been as difficult of cure as in ordinary cases." P. 72, &c.

With respect to diuretics, considered as evacutaries, Mr. Hunter observes, that they may have the same general remarks made on them as have been offered in regard to purgatives. It is possible, says he, that specific medicines, taken into the constitution (if we had such), and passing off by the urine, might act upon the urethra in their passage through it. The ballasts and turpientes pass off in this way, and become specific for many irritations in the urinary passages; but how far medicines which have the power of affecting particular parts when found, or when under diseases peculiar to those parts, have also the powers of affecting a specific irritation in them, Mr. Hunter was uncertain. He conceived, however, that they might be capable of removing any attending irritation, though not the specific one. He thought, that diuretics did good inasmuch as they increased the quantity of urine; but he believed simple water was best for this purpose, or water joined with such things as encourage the patient to drink a good deal, as with tea, capiliaries, ipecacuanha, &c.

Allirgants have frequently been preferred, though without the approbation of the generality of regular practitioners. It was Mr. Hunter's opinion, that, such medicines did not lessen the inflammation, but that they often lessened the discharge.

With regard to local applications, they may be either internal to the urethra, or external to the penis. In many cases both kinds are proper. One would suppose, that what is applied to the urethra, must be the most likely to effect a cure, by coming immediately into contact with the diseased parts.

Local applications to the urethra may be either in a solid or fluid form, each of which has its advantages and disadvantages. A fluid (says Mr. Hunter) is only a temporary application, and that of very short duration.

The solid applications may remain a long time, and, in this respect, would seem to be better than fluid ones; but in general they create irritation. They must be used in the form of a poultice, which Mr. Hunter imagined was comparatively injurious, when the parts were in an inflamed state, though the effect, in cold medicines, that he never saw any harm from it in any case, when employed with caution.

Fluid applications to the inside of the urethra are usually called injections, and, like the internal remedies, are without number. However, as the inflammation is frequently removed under the use of injections of various kinds, have we not, (as Mr. Hunter notices) a long corroborating circumstance in favour of an opinion, that every such complaint will in time cure itself? This eminent surgeon thought, however, that practice evinced, that an injection often has almost an immediate effect upon the symptoms, and, therefore, that it must have some powers, though the injection, which would have the greatest specific effect, he believed, was not yet known. If an injection has no specific powers, it must be very uncertain in its effects, and can only be of service as far as it may be adapted to a peculiarity of constitution, or parts. As injections are only temporary applications, it becomes necessary to use them often, especially in cases where they are found to be of service. They should therefore be applied as often as convenient, perhaps every hour, or even oftener; but Mr. Hunter adds, that this must be regulated in some measure by the kind of injection; for, if it be irritating, it will not be proper to use it to oftens, as it may be productive of bad consequences.

The same author observes, that many injections remove
the symptoms immediately, or soon after the application, and prevent the formation of matter, which has given rise to the notion of their flushing up the disease and driving it into the constitution; but this supposition cannot be true, since the matter is the only fluid in which the poison is contained, and the formation of the poison is inseparable from the formation of matter. Therefore, if we can prevent the one, the other cannot take place, and, of course, there can be no room for absorption; so that there can be neither any power of infecting the constitution in the same person, nor of communicating the infection to others.

Mr. Hunter divided injections into four kinds, namely, the irritating, sedative, emollient, and astringent. He believed that we are not acquainted with any specific one, although a mercurial injection, of some sort or another, is frequently fancied to have such a quality.

All irritating injections act upon the principle of producing an irritation of another kind, which ought to be greater than that of the gonorrhoea, by which means the fust is destroyed, and the disease cured, although the pain and discharge may still be kept up by the application.

These symptoms will soon go off, as soon as the injection is laid aside, because they only arise from its irritating qualities. In this way bongues, as well as any minor injections, may be supped; to perform a cure, and although they increase the symptoms for a time, they never can increase the disease itself; any more (says Mr. Hunter) than the same injection, which would produce the same symptoms, if applied to the urethra of a found man, can communicate the disease. Most of the irritating injections have an astringent effect, and, when mild, prove simply astringents; their irritating quality depending chiefly upon their strength.

Mr. Hunter was not able to determine absolutely the kind of caifes in which irritating injections might be used with advantage. He thought, however, that such applications should never be used when there is already much inflammation, especially in constitutions which cannot bear a great deal of irritation, as a previous knowledge of the disease in the same person sometimes teaches us. Neither should these injections be used when the irritation has spread beyond the specific distance; when the teledicis are tender, or when they have become more upon a sudden diminution of the discharge; when the perineum is very susceptible of inflammation, and particularly if it should have been formerly fuppurated.

Irritating injections also ought not to be employed when there is a tendency in the bladder to irritation, which is known from the patient having had, for some time, a frequency in making water. In all the preceding caises they do no good, and often do mischief: Mr. Hunter thought he had seen abscusses in the perineum brought on by their employment.

In mild cases, and in constitutions which are not irritable, such injections often succeed, and remove the disease almost immediately. The practice, however, as the foregoing writer remarks, ought to be attempted with caution, and not, perhaps, till milder methods have failed. Two grains of corrosive sublimate (hydrargryus muriatus), dissolved in eight ounces of distilled water, are an eligible injection of this kind; but an injection of only half this strength may be used, when it is not the design to attempt a very sudden cure. If, however, the injection that weakened should give considerable pain, or occasion a great increase of, foreshots in making water, it must be still more diluted.

Sedative injections, according to Mr. Hunter, will always be of service in cases where the inflammation is considerable, not by lessening the disease itself, but by lessening the diseased action, which always allows the natural actions of the part more readily to take place. They are likewise very useful in relieving the painful feelings of the patient. Perhaps, says this celebrated surgeon, the best sedative which we have is opium, as when given by the mouth or anus, as when applied to the part affected in the form of an injection. But even opium will not agree, nor act as a sedative in all constitutions or parts. On the contrary, it has often opposite effects, producing great irritability. Lead may be reckoned a sedative, so far as it abates inflammation, while, at the same time, it may act as a gentle astringent. Fourteen grains of faccharum saturni (acette of lead), dissolved in eight ounces of distilled water, make a good sedative astringent injection.

Mr. Hunter next remarks, that the drinking freely of diluting liquors may, perhaps, be considered as having a sedative effect, as it in part removes some of the causes of irritation, rendering the urine less stimulating, either to the bladder, when the irritation is there, or to the urethra in its passage through it; and the plan may possibly lessen the susceptibility of irritation. The vegetable mucilages of certain seeds and plants, and the emollient genus, are recommended for impregnating the patient’s drink. Such substances pass off with the urine, and render the evacuation of that fluid less painful. It is proper to notice, however, that Mr. Hunter does not appear to have a high opinion of the utility of this practice.

When the inflammation is very great, Mr. Hunter believed, that emollient injections are the most proper applications. It seems probable, that they act first by simply washing away the matter, and then leaving a soft application to the part, in which way, says this eminent writer, they can be of singular service by lessening the irritating effects of the urine. A solution of gum arabic, milk and water, or sweet oil, will frequently lessen the pain and other symptoms, when the more active injections have done nothing, or seemed to do harm.

When great irritation and foreshots prevail at the mouth of the urethra, the point of the syringe cannot be introduced, and no attempt to use an injection ought to be made before the inflammation abates. Emollients may be used externally in the form of fomentation.

The astringent injections, observes Mr. Hunter, can only act by lessening the discharge. They can have no specific effect upon the inflammation. They should only be used towards the latter end of the disease, when it has become mild and the parts begin to itch. However, if the discharge should begin mildly, they may be used at the very beginning; for, by gradually lessening the discharge, without increasing the inflammation, we complete the cure, and prevent a continuation of the discharge called gleet. If the astringent injections be strong, they will be irritating, and frequently increase the discharge, instead of diminishing it. When weaker, they often stop the running, without halting, however, the cure in all cases; for the inflammation may still continue even longer than it would have done, had the tendency to secretion not been removed. But sometimes an astringent injection will cure a slight irritation in a very few days. Mr. Hunter never found one astringent more efficacious than another. The astringent genus, as dragon’s blood, the balm, and the turpintines, dissolved in water; the juices of medicinal vegetables, as oak bark, Peruvian bark, tormentil root, and, perhaps, all the metallic salts, as green, blue, and white vitriol; the salts of mercury, and also alum; probably all act much in the same way. Mr. Hunter, however, owns that they do not act equally well in every gonorrhoea,
GONORRHOEA.

Gonorrhea, and that changing the injection will often succeed,
when a long perseverance in a previous one would not.

We have to observe, that the astringent injection, which is most generally approved of by practitioners, is that containing white vitriol (zincum vitriolatum), about half a scruple of which, dissolved in eight ounces of water, is a very good application to begin with. The strength may be increased or diminished, however, as the patient's feelings may require.

Poultices and fomentations have been used as external applications in cases of gonorrhea; but, says Mr. Hunter, they can be of little service, except when the prepuce, glans, and orifice of the urethra are inflamed. It is now more common, in the inflammatory stage of the complaint, to surround the penis with linen kept continually wet with the fuiturne lotion.

When any of the glands of the urethra remain in an indurated state, after the subsidence of the inflammation, the hardnels may be removed by frictions with camphorated mercurial ointment.

It is remarked by Mr. Hunter, that in women, the mode of curing the gonorrhea is nearly the same as in men; but the effects of the principal symptoms is more numerous in females. Hence the cure is more simple.

When the disease is confined to the vagina, it may be easily cured by means of injections, taking care also to wash the external parts with the application. The patient cannot, however, apply an injection to the meatus urinarius, when that passage is affected.

The same kinds of injections are proper for women as are prescribed for men; but they may be made doubly strong, as the parts in women are not nearly so irritable as the common foot of this disease in the other sex.

When the inflammation runs along the ducts of the glands, either of the mouth of the vagina, or of the urethra, or where it affects the glands themselves, the case claims the same treatment as in men. The mercurial ointment should be freely applied to the indurated parts. When the ducts and glands suppurate and form abscesses, these should be opened and dressed like a sore. The ulcer, however, is not regarded as venereal. Though Mr. Hunter entertained such a sentiment, and directed a corresponding treatment.

In the astringent treatments, the symptoms are frequently violent, attended with a strong propensity to the inflammatory fever. The inflammation, however, does not extend beyond the specific disease. Many medicines, which might be of service in another constitution, here do harm, and increase the symptoms which they were intended to relieve. Mr. Hunter has seen opiate glysters after at first doing good, bring on fever and an exacerbation of all the symptoms. He has seen the balsam capivi render the inflammation worse. The treatment of such a constitution, when affected with this disease, should chiefly consist in bleeding and gentle purging. It is proper also for the patient to live sparingly, and use little exercise.

In the weak and irritable constitution, as Mr. Hunter observes, the symptoms are frequently very violent, and often extend beyond the specific disease, the inflammation running along the urethra, and even affecting the bladder. In this instance the foregoing author was of opinion, that a strengthening plan should be adopted.

Sometimes gonorrhea is so capricious in its cure, that the accesion of an accidental fever stops the discharge, removes the pain in making water, and the disorder is permanently cured. Sometimes the symptoms cease on the commencement of the fever, and return when the latter complaint is well. In other examples a gonorrhoea may begin mildly; but a severe fever coming on and continuing for several days, the symptoms of the first disorder are rendered much worse, and, on the fever going off, the gonorrhea likewise disappears. Mr. Hunter remarks, that although a fever does not always cure a gonorrhoea, yet, as it possibly may, nothing should be done while the fever lasts; and if the local complaint should continue after the fever is gone, it is then to be treated according to the symptoms.

The name writer represents, that, unfortunately, there are cases in which no known method lessens the symptoms: evacuations, a strengthening plan, sedatives and emollients, all prove useless, and time alone seems to bring about the cure.

In these instances, Mr. Hunter thought the poisoning plan of treatment the most advisable, and was against the employment of astringents. Neither had he much opinion of the capivi and Cananda balsams, nor of turpentsine in general, though they might diminish the discharge.

A gonorrhoea is also considerably affected by the patient's way of life, during the inflammatory stage. Most things which hurry or increase the circulation, aggravate the symptoms, such as violent exercise, drinking strong liquors, eating strong indigestible food, taking peppers, spices, spirits, etc.

When the complaint begins mildly, or after the violent symptoms have subsided, we may prescribe medicines which will affit the above local remedies, in checking the discharge.

Mr. Hunter thought the turpentine the most efficacious. Cantharides, elliprium vitriolatum, acetate of lead, and alum, have also been recommended.

The reader is already aware, that Mr. Hunter regarded gonorrhoea as a disease arising from the venereal poison, and believed that the matter from the urethra, it introduced into the circulation, would occasion a febrile fever. In order to guard against the effects of absorption, he was an advocate for exhibiting small doses of mercury at an early period of the malady, and for continuing them even for some time after the formation of matter is an end. He advised a grain of the hydrargyrum calcinatus to be taken every night, or every evening and morning; but frictions, with the mercurial ointment, when mercury disaffixed with the fomach and bowels. Most practitioners at this day are strongly addicted to the system of prescribing a grain or two of calomel every day during the treatment of a gonorrhoea, and deem it unsafe to abstain altogether from the use of mercury, in some form or another. Others give calomel with a view of its acting as an alterative and purgative. We never have seen any reason, however, for exhibiting either the hydrargyrum calcinatus, or calomel, or for employing mercury in any mode whatsoever.

Before closing the present article, it only remains for us to say a few words respecting some complaints, which are occasionally attendant on gonorrhea.

When the inflammation is violent, or spreads along the urethra, there is frequently a discharge of blood from the vessels of that part. Mr. Hunter states, that in such cases the balsam capivi has been found serviceable; but that he did not observe any good result from the use of astringent injections.

Opium alone, or joined with camphor, is the best medicine for the prevention of painful erections. Cicuta is also said to prove useful for the same purpose.

With regard to the treatment of chordee, Mr. Hunter remarks, that in the beginning of this complaint bleeding from the arm is often of service, but that it is more immediately useful to take away blood from the part itself by leeches. Great benefit often follows the accidental buming of a vesicle, and a profuse hemorrhage. Relief is often ob-

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ailed
tained from exposing the penis to the steam of warm water. Poultices and fomentations, especially such as contain camphor, are frequently productive of benefit by removing the inflammation. Opium given internally is of singular service, and is still more beneficial when joined with camphor. It lessens the pain and prevents erections, which are the immediate cause of the complaint.

When the chordee continues after all the other symptoms are gone, the only remaining object is to promote the absorption of the extravasated coagulable lymph, by friction with mercurial ointment on the parts. Mr. Hunter informs us, that in one case considerable benefit seemed to result from giving cicutia, after the common methods had failed. Electricity, he says, may also be of service. A chordee is often longer in disappearing than either the running or pain; but, like most of the consequences of inflammation, its declension is gradual and uniform.

Mr. Hunter has seen the kind of chordee, which seems to depend on spasm, relieved by bark.

When the glands of the urethra suppurate, Mr. Hunter advises the use of mercury, just as if the case were a chancre; but this practice is not deemed necessary by the most judicious surgeons of the present day. It is proper to make an early opening into the abscesses, when Cowper's glands suppurate, in order to prevent the matter from making its way into the urethra or scrotum.

When the bladder is affected with irritation, in consequence of gonorrhœa, opiate elettes, the warm bath, and copious bleeding, are the chief means of relief. Leeches applied to the perineum have also good effects. Bleeding, however, in certain conditions, is hurtful, and should always be resorted to with caution. When the complaint lasts very long, resorting ordinary methods, Mr. Hunter fuggles the trial of an opiate plaster on the pubes, or small of the back; or a small blister on the perineum.

The mode of treating a swelling of the testicle, we shall consider under the head, Hernia, Herniaemulosis.

The decline of a gonorrhœa is generally known by the pain becoming less, or changing into an itching, similar to what is often felt in the beginning of the complaint, and which at length goes away altogether. The fonic of weariness about the hips, hips, testicles, and scrotum is no longer felt; and the cherry-like appearance of the glans penis gradually subsides. The running diminishes, or at all events becomes white, then paler, and by degrees assumes a more flaky consistence, in proportion as it becomes more like the natural secretion, which is designed to lubricate the urethra.

Recurrences of the disease every now and then are met with, after the pain, discharge, &c. have quite ceased. Standard-pipes, however, are more common in women than men, and the complaint is usually in a milder form than before.

GONARA, in Geography, a town of Hindoostan, in Bandeland; 20 miles N. of Calingen.

GONS, a town of Hungary; 22 miles S.S.W. of Zatmar.

GONALFO, Hernandez De Cordova, in Biography, an eminent Spanish commander, was born in 1443; and brought up from a very early age to the profession of arms. He signalized himself in a war against Portugal, and under the reign of the celebrated Ferdinand and Isabella he served in the conquest of Grenada. He was afterwards employed to succour Ferdinand king of Naples against Charles VIII. of France, and by his assistance the whole of that kingdom was recovered from the French. Kings, however, are not always consistent in their projects, and the monarch of Spain who had defended and saved one king of Naples, formed a project of supplanting his succedeur, and making a partition of the country with Lewis XII. of France, and Gonalfo was employed to execute the attempt. The warrior was completely successful, and made Alphonso, son of the king of Naples, his captive. Elated with his success, and willing to shew his moderation, Gonalfo swore upon the holy sacrament, a wretched abuse of a religious rite, that the young prince should enjoy his liberty; but after the surrender was complete, and the time was come when he could execute his promise, he pretended that he had received new orders from his own sovereign, which obliged him to send Alphonso, a prisoner into Spain. Without partitioning powers from disfigured among themselves, and the French, being in a greater state of preparation, attacked, defeated, and expelled the Spaniards from most of the places which they possessed. Gonalfo was now compelled to retire with his army, deflute of money, provisions, and ammunition. He retired, however, only to recruit himself, which he had an opportunity of doing among the Venetians, when he rallied, drove the French before him, and entered Naples in triumph. Ferdinand, in the mean time, doubtful of the event, had negotiated a treaty with Lewis, confirming their former partition; but upon the intelligence of the great success of Gonalfo, such was "Spanish honour," that he refused to sign it, and the French were, by the efforts of Gonalfo, obliged entirely to evacuate the kingdom of Naples. For these and other eminent services, he not only obtained the title of the "Great Captain," but was rewarded by his sovereign with many valuable as well as honourable marks of honour. He was made confidant of the kingdom of Naples, raised to the dukedom of Terranova, St. Angelo, and other estates. He at length fell under the suspicion of his sovereign, who sent letters to recall him, which the general repeatedly declined upon different pretences. The king determined to go to Naples, and was met at Genoa by Gonalfo. They entered Naples together in apparent harmony, and the king conferred an additional dukedom on his "Great Captain," but Ferdinand thought it prudent, in the following year, when he left Naples, to take his general with him. At Savosa they had an interview with Lewis XII. who showed his esteem for Gonalfo, by decorating him with a gold chain taken from his own neck, and causing him to sip at the same table with himself. At Venice also he received some magnificent presents. On his arrival in Spain, he was commanded to retire to his own estate at Grenada, where he died in 1513, at the age of seventy-two. Gonalfo is distinguished as a firm disciplinarian, a great master of the art of war, but as one who was never distinguished for generosity of sentiment. Unier. Hist. Mexic.

GONALFO, S., in Geography, a town of Brazil, in the government of St. Salvador; 40 miles W. of Serpique.

GONTAPILLY, a town of Hindoostan, in the circuit of Cacocela; 25 miles s. of Coambique.


By Lourieiro's description of his only species, G. amorifum, a shrub with pinemat ferrated hairy leaves, and by his reference to Rumphi. Amboin. Append. t. 15, it should seem to be allied to Fagara, though the description of the pithil and fruit does not exactly answer. It agrees perhaps better with Brunus, Jaff. 373, both in botanical characteristics and medical properties; see that article. Lourieiro says his plant is found in the woods of China and Cochinchina, and that
the virtues of the root and fruit are diaphoretic, alestetric, antifebrile, and antihelminic. He adds, that "it seems to be the fame drug which the Portuguese call radix de Solar, because it grows in the island of Solar, as well as in Timor, and which is in great use in India." Is the Beraco, after all, an Indian plant? 

GONWA, in Geography, a town of Hindostan, in Gujarat; 20 miles N.W. of Aamood.

GONYALGIA, of qui, koe, ak'te, pair, a term used by some authors to express a violent pain in the knee.

GONZALEZ, Luceria, in Biography, daughter of Pirro Gonzaga, lord of Gazvola, was distinguished as a literary lady in the sixteenth century. The celebrated Bandello was one of her mallers; by him she was introduced to the knowledge of the Greek tragedies. She married, at the age of fourteen, Gianpaola Manfroni of Ferrara, which proved an unfortunate union, since her husband, on account of a plot against the life of duke Hercules II., was unjustly condemned in 1546. The duke did not caufe the sentence to be executed, but was contented with keeping him in perpetual imprisonment, under which he died in 1552. His faithful spouse, Lucretia, employed all her powers to obtain his liberation: she is said to have addressed letters to almost all the powers in Europe, imploring their intercession, and one to the grand seignior, inveigling him to make an attack upon the fortresses where her husband was confined. It must be observed, that these letters have been imputed to Ortenfia Landi; it cannot, however, be doubted, that this lady had acquired a considerable literary reputation by being suppos'd capable of such productions. She was, indeed, panegyrized by most of the learned in Italy in her time, among the rest by Julius Cesar Scaliger, and a volume of poems in her praise was published in Bologna in 1565. Several of her works were printed, one of which was a small volume of poems. She remained single after the death of her husband, and placed her two daughters in a convent. She died at Mantua in 1576. Moreri.

GONZALEZ, Scipio, born in 1542, was son of Charles, count of St. Martino, of the branch of the Gonzaga, dukes of Sabbionetta. He was carefully instructed in letters, and sent to Padua to complete his studies, where he greatly distinguished himself in classical literature. He afterwards acquired considerable reputation for his knowledge in theology and philosophy. Murcius, in 1571, dedicated to him the first volume of his Orations, with a high panegyric: and Guzman submitted to his criticism his "PaiTor Fido." He was created cardinal in 1587, and died at Mantua in the year 1593, leaving behind him commentaries of his own life, written in elegant Latin. Moreri.

GONZALEZ, Venetiam, duke of Sabbionetta, born in 1531, is celebrated as a commander in the service of Charles V. and Philip II., but he is still more distinguished as a splendid promoter of the arts and sciences. He built from the ground up the city of Sabbionetta, which, for the neatness and regularity of the streets, the architecture of the private houses, the beauty of the churches, and the elegance of the public buildings, has excited universal admiration. He also founded in it a public school for the learned languages, to which he invited as a professor Mario Nizzoli, one of the most learned men of the age. His palace was always full of men of knowledge and science, of whom he was the liberal patron. Gonzaga employed Scamozzi in the creation of a very fine theatre, for the performance of dramatic pieces, and he is himself recorded as an elegant Italian poet. He is mentioned with high respect and applause by Tasso, and other literary characters, and he is noticed as a collector of books.

GONZALEZ, in Geography, a town of Italy, in the department of the Mincio; 16 miles S. of Mantua.

GONZAGA, St., a town of Peru, in the audience of Quito; 60 miles N.W. of St. Josaf of Huasas.

GONZALES, Bartolome, in Biography, a painter, born at Valladolid in the year 1564. He frequented the school of Patricio Caxes at Madrid; in the sequel painted much for Philip III. at Burgos, Valladolid, Lerma, in the Pardo and Escorial, till 1617, when he was made painter to the court, in the place of Fabricio Castello. His portraits are admirable, especially the six whole lengths with the date 1621, poiffided by the baron of Casa Davallillo. In hifory, his style was ornamental; his drapery, a varied imitation of Iifa, by its illusion captivated the vulgar, while it destroyed the dignity, simplicity, and generally the confluence of the subject. He died in 1627, not, as Palomino states, in 1611. Fufeli's Pilkington.

GOOBER, in Geography, a country of Africa, S. of Wangara, between 10 and 12 N. lat. and 15° and 20° E. long. The mountains of Kuiru, so called by Abulfeda, commence in this territory.

GOOCHLAND, a county of Virginia, in America, surrounded by Louisa, Flavonna, Hanrico, Hanover, and Powhatan counties; about 40 miles long and 14 broad, and containing 4,693 free inhabitants, and 4,925 slaves.

GOOD, or GOODNESS, denotes whatever tends or conduces to preserve or improve human nature or society; in opposition to evil, which tends to destroy, injure, or impair the fame.

Hence good is divided by the philosophers into 1. Bona fuo, private good; which is that whereby a thing tends to preserve, &c. itself, under which comes that popular division of goods of body, mind, and fortune.

2. Bona communitatis, whatever promotes the interest and welfare of society; as all the civil offices, &c.

Good, in Metaphysics, or Metaphysical Good, called also absolute or real good, and good for its, is the effential perfection or integrity of a thing whereby it has every thing that belongs to its nature.

In this sense, all things are good, inasmuch as they have the perfections naturally belonging to things of their kind. Thus, a thinking subsistence is good, or perfect, as it has all the effential attributes of thought; so an extended subsistence is good, as it possesses all the parts necessary to constitute it such.

In effect, as it is absurd to imagine a being without its essence, so is it to imagine a being without the requisites of its essence: so that it appears an error in some philosophers, who divided beings into good or perfect, and evil or imperfect. See Essence.

Others define metaphysical, or transcendental goodnes, by congruency with the divine will, which they say, constitutes the measure of all real goodnes.

Goo, Physical or Natural, is that whereby a thing possesses all things necessary to its be and eff, i.e. its well being, or second perfection, and to the performance of its functions and uses.

In this sense, physical goodnes coincides with physical perfection.

To this are required the several powers and faculties, in their proper degree; a due situation, figure, and proportion of parts, &c.

Note, before absolute physical goodnes, there may be a relative one; as in foods, which is to one, are salutary, to another poison, &c. To this head also belong the things good pro tempore, or according to circumstances; as the amputation of a mortified limb, &c.

Natural
Natural good may be otherwise defined to be that which makes or denominates a being happy, or prepares him for happiness; or, at least, prevents or removes his misery: accordingly, good is either objective or formal; objective good is that which makes us happy: formal good, or the pleasure resulting from the application of the faculty to the object, is that which denominates us happy.

Gourn, Moral or Ethical, is the agreement of a thinking, reasonable being, and of the habits, acts, and inclinations of such a being with the dictates of right reason, and the will of the Creator, as discovered by natural light. See Virtue.

In order to this, it is not enough that a thing done, said, thought, defired, be just and good; but it must be done, thought, &c. well; i.e. from good principles, and to good ends.

Others define moral good more largely. Moral, which they also call relative good, according to them, is something that is good to another, or that tends some way to the perfection thereof. In this sense they divide it into three kinds, bonum, jactandum, and utilic.

The first, bonum bonitum, is what agrees with right reason, and is desirable for itself; as all things virtuous; e. g. to love God, respect our parents, &c. It is considered without any regard to pleasure; not but there is sincere pleasure annexed to it. Zeno and the Stoics allow of no other goods; those of the body, &c. they call commoda, convenienciae, not goods.

Bonum jactandum is that which is good, as it tends to give us pleasure, and is desired on that account; but without any regard to virtue or right reason; as music to the ears, painting to the eyes, &c.

Bonum utilic, or commandum, is that which is good on account of something else for which it is desired; as money, riches, &c.

Goop, chief, sovereign, or supreme, summan bonum, is that, the enjoyment of which renders men truly and completely happy. The school distinguish this chief good of man into that which is simply and adequately fo, and beyond which there can be no other; and an inferior, subordinated kind, which is, in some measure, attainable in this imperfect state. This last they call felicis vivorum, and the former felicis comprehendorum. The chief or sovereign good, according to the idea collected of it from the original, natural, and universal preconceptions of all mankind, is something agreeable to our nature, conducive to well-being, accommodated to all places and times, durable, self-derived, and inestimable; and this consists, says Mr. Harris, in rectangle of conduct, or in living perpetually delighting, as far as possible, what is congruous to nature, and rejecting what is contrary, making our end that deciding and rejecting only. Three Treaties. &c. 1755, p. 121, &c. 205, &c.

Philosophers are divided as to what the chief good of man consists in: whether in the goods of fortune, of body, or of mind. Some hold riches and honours the supreme good; others, as Aristippus and the Cynic school, bodily pleasures; and others, as Zeno and the Stoics, virtue, or living according to nature. The Peripatetics agreed with the Stoics in maintaining that virtue is the summan bonum: but the Stoics affected farther, that virtue was the only good: whilst the Peripatetics denied, with reason, that virtue was felt different, and therefore required several other things as auxiliaries, such as health, prosperity, friends, &c. which are to the virtuous man in the nature of ingredients or ornaments to his felicity. An excellent writer lays down the following criteria or characteristics of the summan bonum, or chief good, which reason can demonstrate to be actually designed for man: it is something which all men, if not wanting to themselves, may be possessed of; it is one and the same to all mankind: and while in itself fitted to make the possessor happy, it is not prevented in its operation by some other thing which keeps him from enjoying it: and as to the highest good which it is possible for man to enjoy, it must be referred to no other, but all others must be embraced for the sake of this: and it must be sufficient to furnish a happiness adequate to the capacities of human nature, and equal duration; i.e. it must be not only perfect whilst it lasts, but everlasting. According to these characters we may infer, that neither the goods of fortune, nor those of the body, nor even virtue itself, constitute the chief good. Virtue, rightly understood, is the perfection of human nature; it is the influence of obtaining happiness: but this alone will not make a man happy: it is farther necessary that he be perfect as to life, or happy in the circumstances of his being: and, therefore, natural reason demonstrates, that the favour of God, secured by virtue, is properly man's supreme good. Grove's System of Moral Philosophy, vol. i. part. i. paffim. See Epicurians, Peripatetics, and Stoics.

Goodwill. See Benevolence.

Good Works. See Merit and Supererogation.

Good Abusing, bona gesta, in a Low Sense, is particularly used for an exact carriage or behaviour of a subject towards the king and his liege people; to which some men, upon their misbehaviour, are bound.

The judges are empowered by 24 Edw. III. cap. 1. to bind in this manner all them that be not of good fame; under which general expression, it is held that a man may be bound to his good behaviour for causes of scandal, contra bona mori, as well as contra poenam; as, for haunting bawdy-houses; for keeping bad women in his own house; or for words tending to scandalize the government; or in abuse of the officers of justice, especially in the execution of their office: a justice may also bind over all night-walkers, eaves-droppers, such as keep foppish company, or are reported to be pilferers or robbers, common drunkards, whore-masters, the putative fathers of bastards, cheats, idle vagabonds, and any other persons, whose misbehaviour may reasonably bring them within the general words of the statute. Persons of this description may be bound, with one or more furtices, in a recognition or obligation to the king, entered on record, and taken in some court, or by some judicial officer, whereby the party acknowledges themselves to be indebted to the crown in the sum required, i.e. 10s. with condition to be void on non-performance, provided that they behave themselves well, either generally or specially, for the time therein limited; as for one or more years, or for life. This recognition, if taken by a justice of the peace, must be certified to the next sessions, by 3 Hen.VII. cap. 1. and if the condition of it be broken, the recognition becomes forfeited or absolute; and being eflactuated or extracted, (i.e. taken out from among the other records) and sent up to the exchequer, the party and his furtices are become the king's debtors, and are sued for the several sums in which they are bound. All persons under the king's protection may obtain such security, upon due caufle shown; and the justice may be compelled to grant it by a mandatory writ, called suspensio: but this writ is seldom used, for, when application is made to the superior courts, they usually take the recognizances there, under the direction of the statute 21 Jac. I. cap. 8. A recognition may be discharged, either by the demise of the king, or by the death of the principal party bound thereby, or by order of the court to which it is certified by the judge: He that is bound to this, Lumbard says, is more strictly bound than to the peace;
Goon Allen. See Allen.

Goon Behaviour. See Good neighbour and Peace.

Good Confederation. See Consideration.

Good Fortune, or Para, in Geography, an island in the East Indian sea, near the W. coast of Sumatra, about 36 miles long and six broad. S. lat. 1° 5'. E. long. 98° 30'.

Good Taste. See Tast.

GOODALORE, in Geography, a town of Hindostan, in the cirec of Dindigul; 10 miles S. of Ootampanam.

GOODenia, in Botany, so named by the writer of the present article in honour of the Right Rev. Samuel Goodenough, lord bishop of Carlisle, F.R.S. and a vice-president of the Linnean Society, author of a most valuable paper on British Carices, in the second volume of the Linne Society's Transactions, and of one on British Fuci, in conjunction with Mr. Woodward, in the third. The name was contructed after the example of Tournefort, who, as he tells us, not without much consideration, contrived to form Gou- denia out of Gauden/sel/omer. It did not occur to us at the time that Goodenia might have come nearer to the original, and have been equally unexceptionable. It is now too late to make any such alteration. Linnaeus named Richardia after Dr. Richardson, Silliguria after Mr. Silligueri, and these are sufficient precedents. Sm. Tr. of Linn. Soc. v. 2. 346. Brown. Prodr. Nov. Holl. v. 1. 374. Wild. Sp. Pl. v. 1. 954. Mart. Mill. Diet. v. 2. Claws and order, Pentamia Monogynia. Nat. Ord. Campanaceae, Linn. Campanaceae, Juff. Goodeniana, Brown.

Gen. Ch. Cal. Perianth superior, of five, nearly equal, linear leaves, permanent. Cor. of one petal, much longer than the calyx, irregular; tube slit from top to bottom at the back; limb of five deep, firm, lanceolate segments, with thin dilated longitudinal borders, turned moat to one side, forming one lip, or generally two. Stam. Filaments five, shorter than the tube, often projecting through its fissure, capillary, equal; anthers vertical, oblong, of two lobes. Pét. Germen inferior, oblong, crowned with the calyx-leaves, which run down its sides and form ribs; style taper at the base, swelling upwards, undivided, nearly as long as the tube; stigma large, firm, obtuse, enveloped with a cup-shaped cover, more or less two-lipped, its margin fringed with dense upright hairs. Perig. Capsule oblong or elliptical, of two valves separating at the top, and two (rarely four) cells, the partition flat, parallel to the valves. Seeds numerous, imbricated, compressed.

Eff. Ch. Corolla of one petal, slit longitudinally at the back; limb in five deep segments turned one way. Anthers separate, bearded. Stigma with a cup-shaped fringed integument. Capsule inferior, of two or four cells, with a parallel partition. Seeds numerous, imbricated.

Obs. Mr. Brown has remarked, in some species, a small bag of honey attached to the germe, opposite to the fissure in the corolla.

Eight species of this very curious genus were originally defined in the Linnean Society's Transactions, three of which, having been described without a knowledge of their fruit, are now, on more full examination, removed by Carvanilles and Brown to other genera. There are the albidus, fritha, and ramosissimus; the latter, which, like the albidus, is a Scrophulus, may be seen in Sm. Bot. of N. Holl. t. 5. The fritha belongs to Mr. Brown's Dauceiras. But on the other hand the discoveries of this indefatigable collector and accurate botanist have increased Goodenia to 32 species, all natives of New Holland or of Van Diemen's land. Of these the first 28 have a two-lipped corolla, and the first 25 of them have yellow flowers, the red blue or purple. Of the remaining four, two have a single-lipped corolla, and the others are doubtful in this respect, it being doubtful whether these have properly belong to the genus. One of them is Sellera radiata, Cavan. L. t. 474. I. 2. Gooden- ia repens; Billard. Nov. Holl. t. 76.

Satisfactory examples of the genus are, G. paniculata. Sm. n. 2. Cavan. L. t. 507. This has yellow flowers in terminal panicles. Leaves mostly radical, strongly toothed. Herbage hairy.

G. rota. Sm. n. 1. Cavan. L. t. 526. Andr. Repof. t. 68. The first species that bloomed in England, and from which the genus was described. This has rather shrubby stems, ovate nearly serrated smooth leaves, and axillary forked flalks, bearing elegant yellow flowers. It is a desirable ornament for a greenhouse, and not difficult of culture.

G. grandiflora. Sims in Curt. Mag. t. 390. Differs from the last in being downy, with laurate leaves and larger flowers, whose tube is split into four segments, andingularly rough or bearded within.


GOODENOVIUM, a natural order of plants recently established by Mr. Brown. Prodr. Nov. Holl. v. 1. 573, being separated by him from the Campanulaceae of Sullivans, and essentially distinguished by a peculiar cup-shaped integument, either undivided or two-lobebed, which contains the stigma, and has hitherto been described by botanists as the stigma itself. See Campanulaceae.

Mr. Brown describes his new order as follows:

Calyx superior or half superior, rarely inferior, five-leafed, sometimes in five or three deep divisions, sometimes five-leafed, undivided, and occasionally obflate; its segments equal, rarely unequal, permanent.

Corolla of one petal, more or less irregular, deciduous or withering. Tube split longitudinally, sometimes separable into five portions, while the calyx is merely attached to the base of the germen. Limbs in five deep segments, composing one lip or two, their disk lanceolate, flat, their sides, or wings, of a thinner texture, elevated, folded inwards when young, rarely oblate or obtuse.

 Stamina five, unconnected with either corolla or stamens, and alternate with the divisions of the former. Filaments distinct. Anthers either separate or coherent, linear, vertical, attached by their base, undivided, two-celled, the cells opening lengthwise. Pollen simple, rarely compound.

Germen of two or four cells, rarely of one only; the seed-masses of the seeds either indefinite or definite, erect; sometimes bearing a gland between the two anterior filaments. Style one, simple, very rarely divided. Stigma lobate, oblate, either undivided or two-lobed, encompassed from beneath with a somewhat membranous, cup-shaped, entire or two-lobed integument, the great peculiarity of the order.

Pericarp, when the number of the seeds is indefinite, a capsule of two cells, rarely four, or sometimes, from the shortness of the partition, of scarcely more than one. Partition mostly parallel, rarely contrary, to the valves, which are either undivided or cleft, bearing the seeds on its margin. When the number of the seeds is definite, one being in each cell, the pericarp is a drupa or a nut, rarely an utriculus (or membranous undividing capsule), bearing the feed from its base.

Seeds often with a thickish coat, sometimes with a hard shell.
clown. Albumen flabby, shaped like the seed, seldom wanting.

Embryos straight, as long as the albumen. Cotyledons of a middling size, often leafy. Plumbago inconspicuous.

These plants are either herbaceous or shrubby, not milky, chiefly found in the southern hemisphere, rarely within the northern tropic. Their paleness when pressed is generally simple, sometimes glandular, rarely tattered. Leaves scattered, without stipules, simple, mostly undivided, sometimes lobed, often toothed. Inflorescence terminal or axillary, various. Flowers dimorphic, very rarely aggregate, yellow, blue or purplish, seldom reddish.

The first section, with indeffinite seeds, contains six genera:

*Goodenia*, *Galago*, *Fortunella*, *Vellina* of Smith, *Lechenaultia* and *Ambition*: the second, with definite seeds, three genera: *Scaevola* of Limnace, much augmented, *Diaspia* and *Ampela*: the third, section, with a single-seeded *utricularia*, is contrived to admit the *Brunnula*, named after the worthy and intelligent author, by Dr. Smith in the tenth volume of the Linnaean Society’s Transactions not yet published. The place of this genus in a natural series is extremely difficult to determine. It agrees with the *Goodeniae* chiefly in having an integument to the stigmas, but in habit, aggregate flowers, four distinct bracts, and some other marks, agrees with the *Dipsosea* of Jaffeur, to which it is referred, not without doubt, in the Linnean Transactions. It consists of two species, *Brunnula fricii*, and *australis*, herbaceous plants, with the aspect of simple-leaved *Scaevola*.

**GOODEROE**, in *Geography*, a town of Abyssinia; 24 miles S.S.E. of Mience.

**GOOD HOPE, or HOPE ISLAND**, an island in the S. Pacific ocean, discovered by Le Maire and Schouten in 1616. The land is mountainous, not very high, and abounds with cocoa-nut trees; the coast affords no anchorage. S lat. 16° E. long. 174° 15′. — Alfo, the name of a Danish colony in West Greenland. N lat. 64°.

**Good Hope, Cape of.** See Cape.

**GOODIA**, in *Botany*, in memory of Mr. Peir Good, an industrious gardener, employed in collecting seeds in New South Wales for the Kew garden. He died, some years since, in that remote country, and Mr. Brown has always been so sensible of his merits, that he has long defined a genus to his honour. — Salif. Parad. Lond. t. 41. Sims in Curt. Mag. t. 598.—Chaff and order, *Diadelphus Decandria*. Nat. Ord. Papilionaceae, Linn. Leguminoseae, Jaff.


Eff. Ch. Calyx two-lobed; the upper cleft, broad and short. Legume flat, compressed, flat at the upper edge, of one cell. Seeds two.

ObBiz. This genus, as Dr. Sims observes, ought to be placed next to *Bojetia*, Tr. of Linn Soc. v. 9, 302; from which it differs essentially in its legume, which has no dilated thickened edges, nor is it internally fleshy nor many-celled. The flowers are truly diad. In which it differs from *Crotalaria*, as also in not having an inflated legume, though its habit comes nearest to that genus.

Two species are known.

1. *G. lobifolia*. Curt. Mag. t. 958.—Leaflets smooth, as well as the branches and flower-stalks.—Native of Van Diemen’s land. One of the first New Holland plants raised in this country, and very hardy in the green-house, possibly able to bear our climate. Mr. Aiton favoured us with specimens from Kew in 1796. It is a delicate smooth *fruab*, with tarmate somewhat glaucous leaves, and terminal clusters of numerous yellow flowers, the bafe of whole standard, and part of the wings, are flamed with crimson, as in many New Holland flowers of this family. The legume is somewhat ovate, with a taper base, smooth, but marked with numerous, transverse, parallel, reticulate veins. One seed only is usually perfect.

2. *G. pulchella*. Curt. Mag. t. 1332.—Leaflets downy, as well as the branches and flower-stalks.—Very like the former, and brought from the same country. It flowered at Mr. Lodige’s at Hackney. We think with Dr. Sims it has sufficiently the aspect of a distinct species, thought it downy, often a variable circumstance, affords the only specific character. The leaflets in the plate do not answer to its definition of obcordate, and we believe they vary in shape, as in many leguminous plants.

**GOODIANELLI, in Geography, a town of Hindoostan, in Myfore; 19 miles N. of Seringapatam.**

**GOODMANELLE, a town of Hindoostan, in My- forest 20 miles W. of Bangalore.**

**GOODINGARY, a town of Hindoostan, in Tinelly, near the coast; 50 miles S. of Calcuta.**

**GOODLICK BAY, a small bay in the strait of Magellan, entirely surrounded by rocks. This bay supplies a little wood, and plenty of good water, but it is very difficult of access. S lat. 53° 23′; W. long. 74° 33′; Variation two points easterly.**

**GOODNESS, in Theology, expresses one of the attributes of the Deity, sometimes denominated Benevolence. (See Attributes and Benevolence.) Dr. Paley, in his “Natural Theology,” illustrates and proves the divine goodness by two propositions, which may be evinced by observations drawn from the appearances of nature. The first of these propositions is, that in a vast plurality of instances in which contrivance is perceived, the design of the contrivance is beneficent. No productions of nature display contrivance so manifestly as the parts of animals, and all these parts have a real, and with very few exceptions, a known and intelligible subserviency to the use of the animal. Nor is the benevolent design of the creator abortive. The world, made with this design, is a happy world. The air, the earth, the water, teem with delighted existence. This argument is stated by the author in his “Moral Philosophy” in the following manner; “Contrivance proves design; and the predominant tendency of the contrivance indicates the disposition of the designer. The world abounds with contrivances, and all the contrivances which we are acquainted with are directed to beneficial purposes. Evil no doubt exists; but is never, that we can perceive, the object of contrivance. Teeth are contrived to eat, not to ache; their aching now and then is incidental to the contrivance, perhaps inseparable from it; or even, if you will, let it be called a defect in the contrivance; but it is not the object of it. This is a distinction which well deserves to be attended to. In describing improvements of husbandry, you would hardly lay your finger on the sickle, that it is made to cut the reaper’s hand, though, from the contruction of the instrument, and the manner of using it, this mischief often follows. But if you had occasion to describe
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describe the instruments of torture or execution, this engine, you would say, is to extend the fines; this to dislocate the joints; this to break the bones; this to scourch the soles of the feet. Here pain and misery are the very objects of the contrivance. Now, nothing of this sort is to be found in the works of nature. We never discover a train of contrivance to bring about an evil purpose. No anatomist ever discovered a system of organization, calculated to produce pain and disable; or in explaining the parts of the human body, ever said, this is to irritate; this to inflame; this duct is to convey the gravel to the kidneys; this gland to produce the sweat; this organ, if by chance, he come at a part of which he knows not the use, the moat he can say is, that it is useless; no one ever suspects that it is put there to incommode, to annoy, or to torment."

Our author's second proposition is, "that the Deity has added pleasure to animal sensations, beyond what was necessary for any other purpose, or when the purpose, so far as it was necessary, might have been effected by the operation of pain." There is a class of properties, pertaining to animals, which may be said to be superadded from an intention expressly directed to happiness; an intention to give a happy existence distinct from the general intention of providing the means of existence, with which other capacities are connected; and that is, of capacities for pleasure, in cases, wherein, so far as the conservation of the individual, or of the species, is concerned, they were not wanted, or wherein the purpose might have been secured by the operation of pain.

The provision which is made of a variety of objects, not necessary to life, and administering only to our pleasures; and the properties given to the necessities of life themselves, by which they contribute to pleasures as well as to preservation; shew a farther design than that of giving existence. This observation is illustrated by our ingenious author in a variety of familiar instances, deduced from the senses of taste, hearing, smell, and sight. The senses appear to be specific gifts, ministering not only to preservation, but to pleasure.

But the senses, as they are usually called, are far from being the only vehicle of enjoyment, or the whole of our constitution, which is calculated for the purpose. We have many internal sensations of the most agreable kind, hardly referable to any of the five senses. Besides these there are exercises of the understanding in volition, &c. of the imagination, and of other faculties of the mind, which furnish unmix'd gratifications, without any counterbalancing pains. Whilst the above-mentioned propositions can be maintained, we are authorized to ascribe to the Deity the character of benevolence; and what is benevolence at all, null in him be infinite benevolence, by reason of the infinite, that is to say, the inexcusably great, number of objects, upon which it is exercised. But besides the evidences of divine goodnes that are furnished by a survey of the creation of the world, and especially of mankind; the same attribute is evinced in the providential government of the universe, and in the extraordinary means which the Deity has soled and pursued for mitigating the present condition of the human race, for recovering mankind from the degeneracy and misery that have prevailed in consequence of their own folly and vice, and for conducting them to the perfection of knowledge and virtue, and a happy immortality in a future world.

The character and undertaking of Jesus Christ, and all the benefits that redound to mankind from his mission and mediation, reflect peculiar luster on the benevolence of the Deity.

GOODOR, in Geography, a town of Hindoostan, in Coelonda; 35 miles S.E. of Warangole. — Also, a town of Hindoostan, in the circle of Adoni; 15 miles N.N.E. of Condumore.

GOODS, in Mining, signify, in Derbyshire, the large and sizable lumps of lead ore, otherwise called binding or potter's ore.

GOODS, among public brewers, denote the malt or grains and liquor in their muth-tun.

GOODS, bona, in Law, and particularly the Civil Law, include all kinds of effects, riches, lands, possessions, &c. There are two kinds of goods; moveable, re movenles, or mobiles; and immovable, called res non movenles, or immobiles.

It is a maxim in the civil jurisprudence, that he who confounds the body, confects the goods; meaning, that all the effects of a person condemned to a capital punishment, or perpetual banishment, are forfeited to the king.

A man is said to bind himself body and goods; meaning, that besides his goods, he obliges his person, and submits to remain in prison, provided he do not execute his promise.

Goods, again, are divided into, 1. Proper, patrimonial, hereditary; 2. Acquired or acquit; also quin bera; ditatis juris acqinlit, and, 3. Conquella; vero & uxoria familia acquisita.

Goods, again, are divided into real and personal. (See Chattels and Estate.) And, lastly, into noble or free, and servile or base.

Goods belonging to the domain of the crown, ad ferae speciulit, cannot be alienated for ever, unless it be done by way of exchange; they may be sold under the faculty of perpetual redemption.

Goods, Adjuvutia, adventitia, are those which arise otherwise than by succession, from father or mother; or from direct ancestor to descendant. See Adventitious.

Goods, Dotal, dowina, those accruing from a dowry, and which the husband is not allowed to alienate. See Dowry.

Goods, Fugitive. See Fugitive.

Goods, Paraphernalia. See Paraphernalia.

Goods, Prohibited. See Prohibited.

Goods, Presumptuous, profistititius, are those arising by direct succession.

Goods, Receiptments, were those which the wife might receive the full property of to herself, and enjoy them independently of her husband; so called, in distinction from dotal and paraphernal goods.

Goods, Patrimo, or patrimo, are those abandoned, or left at large, either because the heir renounces them, or that the default has no heir. See Bona.

Goods, Alloting. See Alloting.

Goods, Consequent. See Consequent.

Goods, Running. See Running.

GOODWIN, John, in Biography, a learned divine in the seventeenth century, who is said to have made more noise in the world than any other person of his age, rank, and profession. He was born in 1595, and received his academical education, at Queen's College, Cambridge; he was immediately after he was admitted to orders, he was much admired for the erudition and elegance which distinguished his pulpit compositions. In 1633 he was induced to the living of St. Stephen, Coleman Street, London, from which he was ejected in 1645, because he refused to baptize the children of his parishioners promiscuously, and to administer the sacrament to his whole parish. He embraced the Armenian doctrines, and eagerly pleaded their cause in his sermons and writings, he adopted and maintained the independent form of church government.
government, and he was reckoned to be exceedingly faithful and courageous in attacking or repelling those who opposed him. His tenets were not those generally embraced, and at one period he is characterized as a man by himself; as being against every man, and having almost every man against him. He had a clear head, a fluent tongue, a penetrating spirit, and a marvellous faculty in debating on scripture. In politics he was a decided and strenuous republican, and, being eager in whatever he engaged, distingushed himself by his discourses and writings to promote, and afterwards to justify, the condemnation of the king. He lived, however, long enough to feel the weight of government directed against himself and his writings. He was obliged to abdicate for a season, and one of his pieces was burnt by the common hangman, and in the same fire which executed his commission on the "Defenso pro populo Anglicano," by John Milton of immortal memory. The friends which his Arminian principles had procured him, found means to pacify the people in power, and to allure themselves that Goodwin should not be prosecuted for the part which he had taken in the late reign.

He returned from solitude, and became minister of a private congregation in the neighbourhood of Coleman street, and, disapproving of the act of uniformity afterwards passed, continued a dissentier from the established church of the Independent denomination, till his death in 1665, in the seventy-second year of his age. His works, which are chiefly theological, are very numerous, among which the following may be mentioned; "Redemption Redeemed," in folio. "The divine Authority of the Scriptures," 4to. "An Exposition of the ninth Chapter of the Epistle of St. Paul to the Romans," 4to. Neal's Hist. of the Puritans, &c.

Goodwin, Thomas, who is styled by Anthony Wood "One of the Attalies and patriarchs of independency," was born in the year 1600 at Redby in Norfolk. Having received the elements of a grammatical learning, he was sent, when he was thirteen years old, to Christ-church college, Cambridge, where he applied himself with so much diligence to his studies, as to secure the esteem of his teachers, and to attract much notice in the university. In 1629 he was removed to Trinity Hall, of which he became a fellow. He soon felt a decided inclination to the views and sentiments of those who were denominated Puritans, and taking them as his models, he prepared himself for the office of a Christian minister. It is not known when he took orders, but he was elected lecturer of Trinity church, in Cambridge, in the year 1628, and in 1632 he was presented by the king to the vicarage of the same church. In these employments he was greatly admired and followed by the Puritans, who began to look up to him as a leader, but becoming dissatisfied with the terms of conformity, he relinquished his preferments, and quitted the university in the year 1634. In 1639 he was elected as an object of persecution by the episcopal consistory, and to enjoy liberty of conscience he fled to Holland, where he was chosen pastor to an independent congregation at Arnhem. During the sittings of the Long Parliament he returned to London and became pastor of a church there, and also a member of the assembly of divines. His conduct, in their various meetings, and his zealous support of the Presbyterian, contributed to render him a favourite with Cromwell, through whose influence he was, in 1650, made one of the commissioners for the approbation of public preachers, and also appointed president of Magdalen college, Oxford. Here he formed a church upon the independent plan, and was exceedingly diligent in promoting the interests of learning and piety. His public duties as a preacher did not prevent him from those studies which enabled him to become distinguished as a writer. He attended Cromwell upon his death-bed, and was overheard to express himself boldly and enthuastically confident of the protector's recovery; and it is affirmed that when the event proved him mistaken, he exclaimed in a subfrequent address to God "thou hast deceived us, and we are deceived." After the restoration he was dismissed from his presidency, when he retired to London, where, however, he was permitted to continue in the exercise of the ministry till his death in 1679, when he had attained to his eightieth year.

He was a considerable scholar, and a learned and eminent divine. In the common register at Oxford he is described "in scriptis in re theologicae quam plurimos Orbi notus." He was a high Calvinist, but while zealously endeavoring what he conceived to be the doctrines of Christianity, he did not forget to enforce by every incitement in his power the necessity of pure moral conduct. He was author of numerous pious and controvertical pieces, sermons, expositions, &c. some of which were printed during his life time, and inserted, after his death, in a collection of his works published in five volumes folio, which continue to be read and quoted by Calvinites of the present day. Neal's Hist of Puritans, by Toulmin.

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Googoo, in Geography, inhabitants of the inland territory of the island of Sumatra, covered with long hair, and little superior to the orangs outangs of Borneo. See Sumatra.

Googoor, a town of Hindooilan, in Sanore; 25 miles N. N.W. of Sanore.

Googul, a river of Hindooilan, which rises near Burwany, and runs into the Tapty, 8 miles S. of Chaprah.

Goot, signifies a ditch or trench for water; called also a goit, gurt, lunt, &c.

Gooole, a breach in a sea-bank or wall; or a passage worn by the flux and reflux of the sea. Vide 16 and 17 Car. II. cap. 11.

The word comes from the French, goilet, the gullet or neck.

Goolunge, in Geography, a town of Hindooilan, in the cireer of Chanderce; 25 miles E. of Chanderce.

Goolah, a small cireer or province of Bengal, situated E. of Coor-Beyhar.

Goomah, a town of Bengal, 45 miles N. of Ramgar, N. lat. 24° 25'. E. long. 85° 34'.—Allo, a town of Hindooilan, in Bahar; 40 miles N.E. of Chittara.

Gombo, a town of Africa, in Cambara. N. lat. 15° 31'. W. long. 5° 10'.

Gomboano, a town of Africa, in Kaflan. N. lat. 14° 20'. W. long. 8° 50'.

Goomong, a town of Hindooilan, in Berar; 12 miles S. of Nagpur.

Gomerfun, a town of Hindooilan, in Oude; 16 miles S.W. of Azimgur.

Gompinna, a town of Hindooilan, in Colconda; 20 miles N. E. of Cullor.

Goomrepor, a town of Hindooilan, in Alaha-bad; 20 miles E. N. E. of Jumport.

Goomty, a river of Aifs, which rises in the moun-
tains of Kededon, and crossing the country of Oude, enters the Ganges, about 15 miles N. of Benares.

GOOUGANGAY, a small island in the East Indian sea, near the N. E. coast of Cutch. S. lat. 8° 10' E. long. 110° 24'.

GOONDWHANAH, the ancient name of the province of Nagepore, which also—Allo, mountains of Hindooftan, called "Kummnah." situated in the S. E. part of the country of Malwa, extending from Huffingabad to Munderah, about 170 miles long. N. lat. 22° 40', to 23° 1 E. long. 78° to 81°.

GOOPAMOW, a town of Hindooftan, in Oude; 20 miles W. of Kairabed.

GOOPIJUNGE, a town of Hindooftan; 32 miles W. of Benares.—Allo, a town of Hindooftan, in the four-bah of Agra. N. lat. 26° 24'. E. long. 79° 18'.

GOORACKPOUR, a province of Oude, bounded on the N. by Thibet, on the E. by Bettish and Sarum, on the S. by Gazypore, and on the W. by Oude proper and Bahrait, about 60 miles long and 50 broad. The capital of the same name is situated 65 miles E. of Pysabad. N. lat. 26° 44'. E. long. 83° 30'.

GOORAH, the name of two towns of Hindooftan; one in Oude and another in Allahabad.

GOORUNTY, a town of Hindooftan, in the circur of Cicaole; 17 miles S.W. of Ganjam.

GOOS, a town of Nubia. N. lat 18'. E. long. 34° 18'.

GOOSANDER, in Ornithology. See MERGUS MERGANFER.

GOOSE, Anser, forms an order of birds in the Linnean system. (See ANSEREN.) The several species of geese belong to the genus of anas or duck under this order. See DUCK.

Goose, a well-known bird, which, in many situations, may be highly beneficial to the farmer, as, where there are large waters and commons, and where the flubbles are abundant. It is valuable both for its flesh, fat, and feathers.

The varieties of geese are numerous, but the large common kinds are probably the best for the uses of the farmer.

GOOSE, Ember. See COLUMBUS EMMER.

GOOS, Selan or Solan, sometimes called goamer, the English name of a large water-fowl, called by authors Alector Bifflanus, and by LINNÆUS PELICANUS Bifflanus, which see.

Goos. Crest, in Geography, a river of New Jersey, which runs into the Atlantic, N. lat. 39° 53'. W. long. 74° 16'.—Allo, a river of Kentucky, which runs into the Ohio, N. lat. 38° 16'. W. long. 86° 3'.—Allo, a river of North Carolina, which runs into the Atlantic, N. lat. 34° 40'. W. long. 77° 21'.—Allo, a river which falls into the Potowmac, about a mile S. E. of Thorp's, in Fairfax county, Virginia.

GOOS, ding, in Agriculture and Medicine. See DING and CHEMOPHYTA.

GOOS, gorse, or Wild Garuge, or Good Henry, in Botany. See CHEMOPHYTA.

GOOS-graps, the common name of a troublesome weed that is frequently met with on chalky soils. It is best destroyed by cutting it in the summer, and keeping the land under the plough in good condition. See Galium aparine.

GOOS-graps, Great. See ASPERAGO.

GOOSE Island, in Geography, a small island in the gulf of St. Lawrence, near the coast of Labrador. N. lat. 50° 52'.

GOOSE Lake, a lake of North America. N. lat. 62° 57'. W. long. 94° 45'.—Allo, a lake of North America. N. lat. 54° 30'. W. long. 101° 21'.

GOOS-necked, in Sea Language, is a sort of iron hook fitted into the inner end of a boom, and introduced into a clamp of iron or eye-bolt, which encircles the mast, or is fitted to some other place in the ship, so that it may be unholed at pleasure.

Goose River, in Geography, a river of America, which runs into the Mississippi. N. lat. 43° 14'. W. long. 93° 56'.—Allo, a river of Carolina, which runs into Cooper's river. N. lat. 33° 2'. W. long. 79° 57'.

GOOS, weaving of a sail, in Sea Language, denote the lower corners of a ship's main-sail, or fore-sail, when the middle part is unfurled or tied up to the yard.

Gose-coing, at Sea, a certain manner of fitting a sail, when there is a bed of light earth wind before a wind, or with a quarter-wind, and in a fresh gale, the kaimen sometimes, to make the more bails, unpair the mizen-yard, and then they launch out both yard and yard over the quarter on the lee-side, fitting guyes at the farther end, to keep the yard steady with the boom, and this booms out the mizen-sail. This they do to give the ship the way more, which otherwise, with these winds, the mizen-sail could not do; and this sail, so fitted, is called a goos-coing, and sometimes a fludding-sail.

GOOSEBERRY Bush, Grossularia, in Botany, is a species of the ribs in the Linnean system. See Ribes.

The gooseberry-bush is propagated either by suckers or cuttings, but the latter way is preferable, as the roots are less subject to shoot out suckers afterwards.

The bell Axion for planting the cuttings is in autumn, just before the leaves begin to fall; observing always to take the handiomed shoots, and to pick them from such branches as produce the greatest quantity of fruit. The cuttings should be about six or eight inches long, and should be planted in a bed of light earth exposed to the morning sun; they must be planted about three inches deep, and watered to help their taking root. The shoots should be rubbed off from these plants as they put out, except those at the top, that there may be a regular stem. In the October following, they should be removed to a bed of fine light earth, and planted in rows at three feet distance, and one foot afiinder in the rows. They should remain here one year, and the rows branches at times be cut off, as also the lower ones, so as to keep a clean stem about a foot above the ground. They will be then fit to plant out where they are to stand, which should be in a light sandy loam. They should be kept from the shade of other trees; and to have the fruit in its utmost perfection, should be set in an exposed place in rows of eight feet afiinder, and each of the irhabi six feet from the others in the rows. The bell time for transplanting them is in October, when the leaves begin to decay. Miller.

GOOSEBERRY, in Agriculture, is a plant that may sometimes be employed in the forming of hedge-fences, especially that forl noted in the North by the title of Ironmugger.

GOOSEBERRY Caterpillar, in Gardening, the common name of a very destructive insect to the gooseberry and some other plants. Many different methods of destroying it have been proposed, but with little success.

GOOSEBERRY of Barbados. See CACTUS.

GOOSEBERRY Tree. See MELASTOMA.

GOOSEBERRY-galls, in Natural History, the name given by
authors to a species of protuberances of the gall kind, found very frequently on the oak. They are of a roundish figure, and sometimes adhere to the tree by a short pedicle, but more frequently by a part of their spheric surface. They are usually found on the under side of the leaves of the oak, but sometimes on the young shoots, and sometimes on the pedicles of the leaves.

They are most frequent in spring, but they are found at all times when the leaves are upon the trees. These galls are green at first, and afterwards become yellowish, and finally red, in which last state they very much resemble the small red gooseberry. They are very soft to the touch, and when opened are found to contain a juicy substance, with a cavity in the middle, in which there is lodged a single insect. This, according to the time in which the gall is opened, is found in the form of a white worm, or else of a white chrysalis, or finally of a small short-bodied four-winged fly of a black colour; for the creature does not leave the gall to go through any of its changes, but passes all its states in it. The gall, in all these cases, is found whole and unruptured; but if only is opened in which there is a hole pierced, this is sure to be found empty, that being the palliation by which the fly has made its way out. Reaum. Hift. Inf. vol. vi. p. 214.

Goosberry Islands, in Geography, small islands near the E. coast of Newfoundland; 24 miles N. W. of Cape Bonavista.

Goosberry Rocks, dangerous rocks lying on the coast of East county, in the state of Massachusetts.

GOTTA, a town of Hindostan, in Goomnawah; 10 miles S. of Nagpour.

GOTTO, a town of Hindostan, in the c circuit of Ruttunpour; 5 miles S. of Ruttunpour.

GOTY, or GUTI, a town and fortress of Hindostan, the capital of a district in Myfor; 170 miles N. of Seringapatam. It is situated on a hill beyond the river Penjar, or Penaur, and towards Adoni; and was formerly the seat of government of a Mahattia prince; but at the death of Tippoo, the town and district were alligned to the Nizam. N. lat. 15° 15'. E. long. 77° 48'.

GO-OUT, in Mining, is sometimes used to express the appearance of the edge of a frature at the surface; otherwise called the fault, crop, out-going, or out-burst of that frature; and such fractures are said to go-out, burst-out, run-out, head-out, want-cover, &c.

When the ore in a vein suddenly ends in the dead or gangue, it is said to go-out; also, when a frature of coal ends abruptly against a fault, or wall of gravel filling a fault, or fault under a heap of gravel, as is not uncommon in the south of Derbyshire, it is said to go-out, and so of the irregular or feather-edge marks which are sometimes met within the frature accidentally, or without being continuous like all the regular frature, however thin.

GOPALCHITY, in Geography, a town of Hindostan, in Cimbetore; 18 miles N.W. of Erroad.

GOPALPUNGE, a town of Bootan; 58 miles N. of Dinageproy.

GOPALNAGUR, the name of two towns in Bengal; one 25 miles S.S.E. of Kithenagur, and another 30 miles E.S.E. of Dacee.

GOPALPROO, the name of several towns in Hindostan, one 8 miles N. of Hurdah, a second, 12 miles N. of Goragot, a third, 15 miles N. of Garrah, a fourth, 23 miles S. of Bahar, a fifth, 20 miles N.W. of Nara, a sixth, 20 miles S. of Gourackpore, a seventh, 28 miles S. of Fyzabad, an eighth, 25 miles N. of Amidea-bad.

GOPALDROOG, a furtrel of Mylore; 36 miles E. of Seringapatam.

GOPAULGUNGE, a town of Bengal. N. lat. 23° 2'. E. long. 89° 56'.

GOPALNAGUR, a town of Bengal, 42 miles S. of Hurdah. N. lat. 22° 31'. E. long. 88°.

GOPBER, a town of Bengal; 15 miles N.E. of Ramgar.

GOPERAPILLY, a town of Golconda; 20 miles E.S.E. of Hyderabad.

GOPHNA, GOPNITHI, or Gopnath, in Ancient Geography, a town of Paleafide, and chief place of one of the ten toparchies of Judah. Esnuffles places it fifteen miles from Jerusalem, towards Sichem.

GOPLO, in Geography, a lake of Poland, in the palmatinne of Brzece, 16 miles long, and four wide.

GOPPINGEN, a town of the kingdom of Wurtemberg, situated on the Vils, in a fertile country, having considerabler woodlen manufactures, and near it a medicinal spring; 20 miles N.W. of Ulm. N. lat. 48° 47'. E. long. 9° 47'.

GOR, a town of Persia, in the province of Farifik; 57 miles N.W. of Schiras.—Also, a town of Italy, in the department of the Nela; 8 miles S. of Brescia.

Gos, a name given by some writers to a very lofty tree, which bears a fruit like the chestnut; it grows principally on the banks of the river Niger, and that not near the sea, but far up the country.

Gor-cock, in Ornithology, the name of a gallinaceous kind, called by authors the lagopus altera, and by many the moor-cock, or red game; it is of the shape of the partridge, but is half as large again. See Grous and Tetrao Lago.

GORA, in Geography, a town of Hindostan, in the circuit of Chundal; 20 miles W. of Saipur.

GORACALLY, a town of Bengal; 12 miles S.S.W. of Mahmudough.

GORAGOT, a province of Bengal, bounded on the N. by Rungpur, on the E. by Radjochow, Patladah, and Ulimabad, on the S. by Bettorish and Pargamun, and on the W. by Dinagepore; about 55 miles long, and from 12 to 30 broad. Its capital, Goragot, is distant 80 miles N.E. from Meerchandabad. N. lat. 25° 14'. E. long. 89° 22'.

GORAI, a town of Poland, in Galicia.

GORAM, a small island, being one of the Maluccas, in the East Indian sea. S.E. of Ceram; reputed the most eastern boundary of M.antomatan. It has thirteen mouths. S. lat. 3° 42'. E. long. 121° 36'.

GORANTO, a town of Atalic Turkey, in Caramanin; 80 miles S.W. of Satalia.

GORAPARI, a town of Brazil, at the mouth of a river of the same name, which runs into the Atlantic. S. lat. 25° 20'.

GORARA, a town of Coreia; 8 miles N.E. of Calvi.

GORBATA, a town of Africa, in Bleedelgerid, anciently "Obitha"; 12 miles S.W. of Gafsa.

GORBATOV, a town of Russia, in the government of Novgorod. N. lat. 50° 3'. E. long. 43° 14'.

GORCA, See Gorahit.

GORCE, or Gour, denotes a weir. By flat. 25 Edw. III. cap. 4 it is ordained, that all gorges, mills, weirs, &c. leved or let up, whereby the king's shaps and boats are disturbed, and cannot pass in any river, shall be utterly pulled down, without being renewed. Sir Edward Coke derives this word from gurget, a deep pit of water, and calls it
it a gurz, or gulf; but this seems to be a mislake, for in
Doomday it is called gurt and gurt, the old French word for
a weir.

GORCHWICH, in Geography, a town of Saxon, in the
Vogtland, 18 miles S.S.W. of Gera. N. lat. 50° 22'.
E. long. 11° 53'.

GORMAN, probably a corruption of Gerichen, a

town of Holland, situated on the river Linge, at its union
with the Wahle. From the Steele of the principal church
may be seen 22 walled cities, besides a great number of
towns and villages; before the revolution it had one paroch-

cchurch, and three religious houses; 12 miles E. of Dort.
N. lat. 51° 52'. E. long. 4° 50'.

GORDENE', in Ancient Geography, a country of the
Greater Armenia, according to Ptolemy; which country is
called "Gordyene" by Strabo and by Plutarch in his life of
Lucullus.

GORDES, in Geography, a town of France, in the de-
partment of Vaucluse, and chief place of a canton in the
district of Apt; 9 miles W. of Apt. The place contains
2812, and the canton 6450 inhabitants, on a territory
of 1671, kilometres, in 8 communes.

GORDENWEAR POINT, a cape of Hindooflan, on
the coast of Rajamundry, at the mouth of the Godavery.
N. lat. 16° 42'. E. long. 82° 28'.

GORDIÆUS Monx, in Ancient Geography, a mountain of
the Greater Armenia. Ptol.

GORDIANI, M. ANTONIVS-GORDIANUS, in Biography,
Roman emperor, born A.D. 157, was son of Mucius Ma-
runnus, a senator descended from the Grachi, by Ulpia
Gordiana, of the family of the emperor Trajan. He became
possessed of a great estate, with which he lived in a style of
magnificence, but without puffing the bounds of moderation.
He was a patron of literature and literary men, and a pro-
ficient in eloquence and poetry. He wrote a poem in thirty
books, to celebrate the reigns of Titus and M. Aurelius An-
tonium. When he served the office of edile, he enter-
tained the people with a splendour which no private peron
had for a long time exhibited, and his shows were exhibited
every month in the year W. 1 he was in office. There is,
however, no reason for supposing that he was over ambitious
of coming forwards into public life, for it was not till his
fifty-fifth year that he was elected consul in conjunction with
the emperor Caracalla. He might, perhaps, be unwilling
to rife the safety of his person in those turbulent times;
and it has been thought extraordinary that under so jealous a
tyrant he should venture upon the profuse expences which
distinguished his conduct not only in the imperial city, but
in various parts of Italy also. He enjoyed the fame honour
a second time in the reign of Alexander Severus, who ex-
pressed his high esteem for him by confirming his nomination
to the government of Africa as proconsul. In this impor-
tant post he displayed so much equity and beneficence, that he
was more beloved in the province than any of his predecessors.
Under the emperor Maximin, in the year 237, a sedition
was excited against the capacity of an officer in the government
of Africa, and the perpetrators, to avoid the vengeance of a
cruel and incensed sovereign, appeared in open rebellion
and inflamed upon Gordian's inflaming the purple. He re-
monstrated with the conspirators, but their resolution was
formed, and at the age of forty-four he was forced to ap-
pear in a character, after which he had never aspired. They
associated with him, to alleviate his cares, the younger Gor-
dian, a man of voluptuous habits, but who was of a mild
disposition, and attached to letters. A library of sixty-thou-
sand volumes, bestowed him by his tutor Serenus Sammon-
nicus, gave him reputation in the literary world, which he
maintained by writing both in prose and verse. This young
man had been elevated to the office of quaesitor by the defd-
cable Heliogabalus; nevertheless, the confidence placed in
his integrity, and knowledge of the laws, by Alexander,
who created him prefect of Rome, and who always paid
great deference to his advice, was much in his praise. He
shone in the elevation of his father, and they were declared
joint emperors. The Gordians removed to Carthage, whence
they sent letters to Rome, announcing their election. Maxi-
min was at that time absent, and the senate willingly func-
tioned the choice of the Africans, and declared Maximin a
public enemy. In the mean time, a change took place in
Africa, which annulled all their projects. Capelanium, go-

governor of Mauritania, who had been always upon ill terms
with Gordian, assembled a body of veterans, declared for
the reigning emperor, and marched to Carthage. The youn-
ger Gordian falled out to oppose him with his guards,
but he was soon defeated and slain. Capelanium entered the
city, which so much alarmed the elder Gordian, that to
prevent his falling into the hands of his enemy, he strangled
himself in his apartment with his girdle. This event hap-
pened in June 237, and within a few weeks of his assuming
the office of emperor. Gibbon.

GORDIAN III., Roman emperor, grandson of the elder
Gordian, was but thirteen years old when he was chosen
emperor, in connection with Maximins and Balbinus. He
was created Caesar, and assumed the family name. His two
colleagues were in a few months murdered by the Pretorian
bands, and the youthful Gordian remained sole emperor.
His person and manners excited universal favour, and the
senate, people, and army united in giving him the endearing
appellation of their son. In the commencement of his
reign he was governed by his mother's counsellors, who abdied
his authority, and let the honour and offices of the empire fall to
sole. He was, however, happily rescued from this disgraceful
condition by Mithridates, a man of learning, to whom he was
also indebted for literary instruction and advice. In the
year 234 he married the daughter of Mithridates; and rais-
ing his father-in-law to the poel of prefect-praetorio; com-
mitted him to the principal direction of public affairs. It
proved himself worthy of the important trust confided in him,
and discharged the duties of a statesman and general, as well
as he had maintained those of a more private station. By
his persuasion, the young emperor accompanied him in 242, in
an expedition to the East, for the purpose of repelling an
invasion from Sapor king of Persia. Under his guidance, Gor-
dian relieved Antioch, crossed the Euphrates, defeated Sa-
por, and recovered the whole of Mesopotamia. The young
emperor did not assume the glory of the deeds, but, in a
letter to the senate, announcing the success, he modestly
acquits them to the conduct, the experience, and wisdom of
Mithridates, who shortly after died. During the whole ex-
pedition Mithridates had watched over the safety and discipline
of the army, while he prevented their murmurs by maintain-
ing a regular period in the camp, and by establishing ample
magazines of vinegar, bacon, flour, barley and wheat, in
all the cities of the frontier. The prosperity of the em-
peror expired with Mithridates; he was succeeded in the office
of prefect by Philip, an Arab by birth, and consequently, as
Gibbon, in the earlier part of his life, a robber by profession.
He was a man of considerable military talents, but ambi-
tious, and delinquent of true moral principle. His energy
and boldness prompted him to aspire to the throne, and his
abilities were employed to supplant, not to serve his indul-
gent master. By his arts discontent was fomented among
the
the troops, which induced them to demand that his minister Philip should be associated with Gordian as partner in the empire. This was not sufficient to satisfy his ambitious views; the young emperor was sacrificed at his instigation; he was put to death near the banks of the Euphrates, in March 244, after a reign of five years and eight months. A sepulchral monument was erected to his memory on the spot where he was killed. Gibbon.

**Gordian**, a term in *History*. Gordian knot was a knot made in the leaves or barks of the chariot of Gordius, king of Phrygia, and father of Midas; so very intricate, that there was no finding where it began or ended.

The inhabitants had a tradition, that the oracle had declared, that he should be master of Asia who could untie this knot. Alexander having undertaken it, and fearing that, if he should not be able to effect it, it would be deemed an ill augury, and prove a check in the way of his conquests, cut it afurden with his sword; and thus, say Quintus Curtius, either accomplished the oracle, or eluded it. But Arribolius gives a different account of this matter. See Arrian, lib. iii. cap. 20. and Plut. in Vit. Alex.

Some will have the phrase derived from Gordius who tied the fatal knot; others from Gordium, a city in Phrygia, where the knot was made.

**Gordium**, in *Geography*, a town of Asia, in Phrygia, situated on the river Sangar; afterwards called Julopolis.

**Gordius**, in *Zoology*, a genus of Vermes, the essential character of which consists in the body being round, filiform, naked or smooth, and of equal thickness throughout.

Linnæus, and after his example the French naturalist Bureau, has placed the animals of this genus among the intestinal vermes, an order of beings to which, from their general structure, they seem to bear no very remote alliance; and this similitude is still more strongly evinced in the habits of those species which occasionally penetrate into the flesh of men and animals, and therein for a while derive their subsistence from the blood and other fluids. Notwithstanding this analogy, under such circumstances we cannot but agree with Lamarck that it is impossible to consider them as internal vermes with propriety, since they only occasionally infest the bodies of animals as before mentioned, and in their habits and manners of life at other periods differ much essentially: they are literally aquatic animals, with carnivorous appetites; though for a certain length of time they can habituate like the true intestinal vermes, when by any accidental circumstance they happen to infest themselves into the flesh of a living animal.

At the head of this tribe we may justly place the species *Acrocephalus*, or hair worm of the Indians, a pernicious creature, referred to the genus Gordias by Linnæus in the latest edition of his *Syst. Nat.* but from which it was afterwards removed by his editor Gmelin to that of Filaria. This removal we deem unnecessary, and under this persuasion with to restore the species to its former situation in the genus Gordius.

**Species.**


This very remarkable creature is often from ten to twelve or even fifteen feet in length, and in thickness not exceeding a horse-hair. It is well known by its diaphanous effects as an inhabitant of both the Indies, where it lives in marshy places, and is frequently observed on the ground in the morning dew. In this situation it easily creeps up, and enwraps itself round the naked legs of the negro slaves, or animals, and penetrating the skin, buries itself speedily in the flesh, where it causes the most violent pains, accompanied with troublesome itchings, and oftentimes inflammation and fever. The most certain means of extricating the worm is to make an incision in the part of the flesh at which its entrance was effected, so as to obtain secure hold of either of the extremities, or the head if possible, and this being made fall to a small flick by means of a piece of silk, the animal may be gradually drawn out of the wound by turning the stick round a little each day. The utmost circumspection is requisite in performing this operation, for if by being too much strained the worm should break, the part remaining within the flesh grows with increased vigour, gangrene appears almost immediately, and death itself ensues very shortly.


This so entirely resembles a hair of from four to six inches in length, that except by its motions it could be in no manner distinguished from a substance of that kind by the casual observer; its internal structure is equally remarkable for its simplicity, consisting merely, as it appears, of a canal extending from one end to the other, and both the mouth and vent are the most simple possible, since a small vent constitutes the head, and a groove or hollow the latter. Its ordinary places of residence are stagnant waters; in pools and ditches, or in very tranquil rivers, as the agitation of turbulent waters would destroy its tender frame. During winter it remains buried deep in the clay, from whence it emerges in spring, and is found in the water during the summer months, where it is frequently observed, and from its appearance is vulgarly imagined to be the offspring of hair, dropped by accident into the water. It twists itself into various contortions; and it is affirmed that its bite will occasion the complaint called a whistow. A fact still more extraordinary, and which appears in some measure to be authenticated with tolerable accuracy, is the retentive power of animation, which this creature possesses in a very superior degree, though not by any means to the extent that certain naturalists conceive. Some writers affirm, indeed, that it has been known to recover the free exercise of its vital functions upon being steeped for a short space of time in water, after having remained in a dried state for weeks, months, and even years, and when of course it might be naturally conceived the most latent spark of life must be extinct. If these latter assurances have not arisen from the result of some very superficial experiments, they are at least to be received with caution, since their observers seem to believe that these animals partook also in some measure of the reproductive properties of the polype, and which more recent observations prove to be erroneous; we cannot, therefore, upon the whole, avoid concluding that although the animals of this kind are extremely tenacious of life, there is no foundation in truth for the very extraordinary assertions above related.

**Archilacus.** Body uniformly yellowish. Linn. *Vitulus aquaticus*.

Very much resembles the hair, and like that species is found in the clay at the bottom of stagnant waters.

**Filium.** Body filiform and whitish. Mull. Extremely slender, tapering at one end, and hyaline. Found in the bark of old wooden pipes which had been placed in the ground for the conveyance of water.

**Lacteus.** Body uniformly white and opaque. Mull. Occurs in myriads in stagnant water from the month of July till September. When touched, this species contracts itself in a moment, and then again expands immediately.

**Armillarius.** Pulvus and obtuse. Mull.

Inhabit
GORDON, Bernard, in "Biography," a French physician of the thirteenth century, is said to have conferred honour on the medical faculty of Montpellier, where he began to teach in the year 1215. As was the custom of the time, he took his surname from the place of his birth, (Gordon in Rouergue,) and called himself Bernardes de Gordon, and not Gordonius, as it is commonly written. According to the accounts of some writers, who place the death of this physician in 1305, he taught at Montpellier only twenty years; but Renen affirms, that he was living in 1318. He left a considerable number of treatises, which were published together at Ferrara in 1487, at Venice in 1494, at Paris in 1542, and at Lyons in 1550. Elyot. Dict. Hist.

Gordon, Mr., in the year 1744 played the first violin in Drury-lane play-house. He was a young man, born in Norfolk, who had travelled to Italy for improvement. He was very near-sighted, and always played in spectacles. He succeeded Charke, who had a strong hand, good tone, and was well fitted to his situation. He generally played a concerto in the second music, as was then the practice, which was very attractive. He was brother to the subject of the following article.

Gordon, ———, an eminent performer on the violoncello, the son of a clergyman in Norfolk, and many years the first violoncello at the opera. He was remarkable for the fulness of his tone, and perfect execution of whatever he undertook, though far surpassed by subsequent players in the use of the bow, and knowledge of the finger-board. He lived reputedly, had many powerful friends, and realised a competence by his profession.

In 1765, Mfrs. Gordon, Vincent, and Crawford, undertook the opera regiment in the Haymarket. The two first were experienced professors, and the third had been many years treasurer under different managers. Gordon, an excellent performer on the violoncello; and Vincent, a scholar of the celebrated Martini, long a favourite on the hautbois. His father was a balloon player in the Guards, and his brother, James Vincent, who died young, was joint organist of the Temple with Stanley, and a brilliant performer. Mr. T. Vincent, the impresario, had been in great favour with the late prince of Wales, father to his present majesty; had acquired a considerable sum of money in his profession, which he augmented by marriage. However, the ambition of command, though of so forward a family as an opera, vocal, and instrumental band, turned his head and his purse infide out; in short, he soon became a bankrupt, sunk into indigence during the eft of his life; and his colleagues, though they cleared utter ruin, were not enriched by the connection.

Gordon, Alexander, a learned writer of the eighteenth century, was a native of Scotland. He was well acquainted with the Greek and Latin languages, and being a good draughtsman, he was enabled to derive pecuniary advantages from a long residence in Italy, and from his travels in other parts of Europe. He was engaged as secretary to the society for the encouragement of learning; and to the Egyptian club, and to the Antiquarian society. He afterwards accompanied governor Glen to Carolina, where he occupied various posts in the province, and received a handsome grant of land. Here he died, leaving a good estate to his family.

He was author of "Itinerarium Septentrionale," or a journey through most parts of Scotland, illustrated with copper plates. This was published in 1726, and in 1732 he gave additions and corrections to it, containing an account of Roman antiquities in Scotland, and ancient monuments in the north of England. He wrote likewise "The Lives of Pope Alexander VI, and his Son Caesar Borgia," "A complete History of ancient Amphitheatres, translated from the Italian." "An Essay towards explaining the hieroglyphical Figures on the Coffin of a Mummy," "Twenty-five Plates of all the Egyptian Mummies in England, and other Egyptian Antiquities." Gen. Biog.

Gordon, Andrew, was born in 1712 near Aberdeen. He was sent to Ratibon, where he applied himself to polite literature. In 1731 he made a tour through Austria, Italy, and France, and on his return in the following year entered into the order of the Benedictines in the Scots monastery, where he applied to philosophy, and was ordained priest. In 1735, he went to Salzburg to study the law, and he attended the theological lectures till he was invited, in 1737, to be professor of philosophy at Erfurt. His discoveries in electricity made his name known to the philosophers in Holland, France, Italy, and England, and he is mentioned by Dr. Priestley as the first person who used a cylinder instead of a globe in electric experiments. His first work on this subject was entitled "Phenomena Elec^tricitatis Exposita," 1744; and in the following year he published in 3 vols. 8vo. "Philosophia ultima et jucunda." He was author of an "Impartial Account of the Origin of the present War in Great Britain," and of "Physica Experimentalis Elementa." Gen. Biog.

Gordon, James, a Scotch Jesuit, was born in the year 1543. He left his native country, and came to Rome, where he entered the society of Jesus, in 1563. He became distinguished for deep and extensive learning, and was sent on religious missions into Germany, Denmark, and the British Isles, where he is said to have suffered much on account of his attachment to the Catholic faith. He died at Paris in 1625, leaving behind him a work in two volumes 8vo, entitled "Controversiarum Christianae Fidelis Epitome.

There was another Scotch Jesuit of the same name, and contemporary with the above, who wrote a commentary on the whole bible, which he published at Paris, in three volumes folio, under the title of "Biblia sacra, cum Commentariis ad ejusam Literae, et explicationum Temporum, Locorum, Rerumque omnium quae in facris Codicibus habent obscuritatem; mona cum Textu Bibliico." This work is well spoken of by Dupin. He was author likewise of a work on Chronology; and of "A System of moral Theology," etc. Moreni.

Gordon, Thomas, a native of Kirkcudbright, in Scotland, after having received an academic education in his own country, came to London, and maintained himself by teaching the learned languages. His talents were made known to people of consequence, and he was employed by the earl of Oxford in queen Anne's reign as a political writer. He wrote in defence of bishop Hoadley in the Bangorian controversy, and became the amiable and partner of Mr. Trenchard, in his literary undertakings. They published, in conjunction, a series of papers, entitled "Cato's Letters," and the "Independent Whig," which Mr. Gordon continued alone after the death of Trenchard. When this event took place, sir Robert Walpole engaged Gordon as one of the writers in defence of his interests, and procured him a place, which he held as long as he lived. Mr. Gordon made himself known by translations of Tacitus and Sallust, as well as by his political pieces. Of these translations he prefixed discourses relative to subjects of each original author. He died in 1756, at the age of sixty-six. Some of his polemical tracts appeared in two works, entitled "A Cordial for Low Spirits," and "The Pillars of Prescifraft and Orthodoxy shaken," etc. He was a distinguished writer in favour of civil and religious liberty, and is highly esteemed.
GORDONNA, in Geography, a town of Naples, in the county of Molife; six miles S.W. of Molife.


Gen. Ch. Cal. Perianth fimple, inferior, of five roundish, concave leaves. Cor. Petals five, large, obovate, or obcordate, concave, cohering at their base, somewhat unequal. Stam. Filaments very numerous, thread-shaped, united at their base into a thick cup-shaped body; anthers oval, erect. Pist. German superior, ovate or nearly globose; style short, columnar, obtusely five-fidged, sometimes five-fidged; stigma five, acute, horizontal. Peric. Capsule ovate or globose, of five cells and five valves, the partitions from the middle of the valves, which are deeply cleft at their base. Seeds in two rows in each cell, angular, winged, inserted into a five-angled central column.


1. G. Lacinatus. Linn. Mant. 176. Curt. Mag. t. 668. Cavan. Diff. t. 161. (Hyperiunum Lacinatus; Linn. Sp. Pl. v. 3. 1101. Alecrora floridana quinqucapellaria, &c.; Plbk. Amell. t. 352. f. 3.) Lobolly Bay.—Flower-talks elongated. Leaves coriaceous, smooth. Capsules ovate.—Native of swamps in South Carolina, where it forms a very handsome tree, but is with great difficulty cultivated in England. It blooms in August and September. We have seen this plant flowering in great perfection at Kew 25 years ago. The leaves are feddar, on short stalks, elliptic-lanceolate, three to five inches long, bluntish, with numerous shallow ferratures, veiny, smooth on both sides, of a fine shining green, like those of Prunus Lauro-cerasus above, paler beneath. Stipes none. Flowers solitary, on leafy axillary inflorescences, twice as long as the footstalks, as large as a moderate rose, white with yellow stamens, very handsome but inodorous. A pair of deciduous fringed bracts, a little below the flower, are called by Cavanilles an outer calyx. Authors have differed about the clafs of this plant in the Linnaean system, the filaments cohering imperfectly and irregularly together in par- als, besides being connected by one common fifieh base. If this base be called a nectary, for which there is no good rea- son, the flower is polyphelous, but we think, with Dr. Sims, and most others, that it is monadelphous.

2. G. Heemskerckiana. Swartz. Ind. Occ. 1190.—Blood- red Wood Tree.—Flower-talks very short. Leaves elliptic-lanceolate, pointed, serrated, smooth. Petals inwardly heart-shaped. Style deep five-fidged. Native of dry woody places on lofty mountains, in the west side of Jamaica; Dr. Swartz, from whom we have specimens. This tree, whose ftem is from twelve to sixteen feet high, with a smooth greyish black, and round fnder flat compound leafy branches, Leaves two or three inches long, scattered, on footstalks, elliptic-lanceolate, tapering at both ends, with a blunff, recurved point, smooth on both sides, less coriaceous than in the former, their margin somewhat revolute, with numerous shallow ferratures. Flowers from the bosoms of the upper leaves, solitary, on very short footstalks, not fo long as the foot- stalks, bearing one or two unequal bracteae; their petals pale flesh-coloured, unequal, deeply lobed, fearfly large as those of G. Lacinatus, but flatter and more spreading. Germin filky, furrowed. Style, according to Dr. Swartz, divided into two, Caffule oblong, rather pointed. Seeds two in each cell, with an abrupt point. This tree was omitted by Dr. Swartz in his Prodromus, and is little known to botanists, having never yet been brought to Europe. It flowers in February and March. The wood is hard and of a blood-red, valued in Jamaica for making ornamental fur- niture, but as yet not known, or not distinguished by Eu- ropean workmen. The peculiar structure of the style does not constitute any generic differentiation here, any more than in the neighbouring genus Stauria. See Sm. Exot. Bot. v. 2. 101.

3. G. palafera. L'Herit. Stirp. Nov. 156. Cavan. Diff. t. 162. Vent. Jard. de la Malmaifon. t. 1. — Flowers nearly fesse. Leaves downy beneath. Capsules globose.—Native of South Carolina, now not uncommon in green-houses, flowering in autumn. A handsome shrub, whole branches, calyx, and the back of its leaves, are clothed with fine white depressede down. The flowers most remarkable those of the fift species, but one petal is considerably more concave than the reft, shorter, and downy, approaching to the nature of the calyx. The flower-stalks are extremely short and thick. Leaves ovato-lanceolate, acute, with shallow ferratures, smooth and of a fine green above. Ventenat's figure, drawn by Redouté, the first in the splendid Jardin de la Malmaifon, is one of the finest representations of a plant that can any where be seen, except that the French mode of printing in colours gives indifferently an idea of a downy surface, so that in this case both fides of the leaves look alike.

4. G. Franklinii. L'Herit. Stirp. Nov. 156. (Franklinia Alata; Marhl. Arb. 49,)— Flowers fesse. Leaves smooth. Capsules globose.—Native of South Carolina. Flowers fesse, solitary, large, white, very much admired in their native country, but we have not heard of their being produced in Europe, nor have we seen even a dried specimen. The caflules, according to L'Heri- tier, is globose and umbilicated. Seeds numerous in each cell, imbricated in two rows, sliefly angular, much like those of the Cyprers, the angles somewhat bordered. Leaves alternate, on short footstalks, oblong, toothed, attenuated at the base, and smooth.—Marshall and Botram say the flowers smell like a china orange, and are often five inches in diameter, the lower petal hollow, enfolding the reft till thy expand, as in G. palafera. It was first observed by Mr. John Bartram in 1762, on the borders of the Alatamaha river, in Georgia.

GORDYONG, in Geography, a town of Hindoosfan, in Vifnapur; 22 miles N.E. of Poonat.

GORE, in Heraldry, denotes one of the regular abate- ments, used, according to Guillim, to denote a coward. It conffils of two arches or curve lines, drawn, one from the mitter chief, the other from the mitter base, and meeting in an acute angle in the middle of the fee-point.

GOREL, or GORE, in Geography, an iland in the German ocean, near the mouth of the Meiife, about 120 miles in circuit; two miles N. of Schoven. N. lat. 41 450

E. long
E. long. 3° 35'.—also, a sea-port town of this island, near the E. coast, on a canal communicating with the Meuse; formerly carrying on a considerable trade, but the harbour is now choked with sand; 6 miles W. of Helvoetfluyts.

Gorse, a small island in the Atlantic, within cannon-shot of the coast of Africa, about two miles in circumference. The air is cool and temperate, being refreshed by alternate breezes from the land and sea. It is almost inaccessible on account of its surrounding rocks; but it has two bays, and a fort with several new buildings constructed by a late director M. de St. Jean, who has also rendered it a very strong place. By means of the inundation of fresh water, many of the vegetables and fruit trees have been discovered; so that the island, once barren and desolate, is now made one of the most fertile, pleasant, and important settlements in Africa. Gorse was ceded to the Dutch in 1617 by a king of Cape Verde, and by them fortified. The Dutch were driven out by admiral Holmes in 1663, and the island was garrisoned by the English. It was two years after taken by De Ruyter, and its fortifications augmented by the Dutch; but in 1667 a French squadron compelled the Dutch to abandon Orange fort, and retire to fort Nassau; but here, incapable of defending themselves, they were obliged to surrender at discretion. Upon the arrival of M. du Caffre, the island was formally taken possession of in the name of the Senegal company, and a treaty was concluded with the king and negroes of the neighbouring country on the same conditions with those by which the Dutch had pollied the island. The conquest was secured to the company by the treaty of Nimegen. The French immediately repaired the forts, and changed their names, calling the lower fort "Vermandois," and the higher "St. Michael." In 1750 Gorse was taken by the English. By the treaty of 1763 Gorse and its dependencies were left to the French. In 1778 it was taken by the English. N. lat. 14° 40'. W. long. 17° 30'.

Goree, a small island on the coast of Brazil, at the mouth of the Rio dos Reves Magros. S. lat. 19° 10'.

GOREING, or GORING, is said of a fall when cut planting, so that it is broader at the clew than at the earing, as all top-falls and top-gallant-falls are.

GOREL, a name or title given to the prince of Georgia. The gertil is always a Mahometan. The sophy of Peria obliges him to observe the religion of the Alcoran, in order to preserve the dignity of goret in his family.

GORES'S Bay, in Geography, a bay on the S. W. coast of the island of Tavay-Poomannoo. S. lat. 43° 12'. W. long. 16° 36'.

GORE'S Island, an island in the N. Pacific ocean, so named by captain Cook in the year 1778. This is a narrow island, particularly at the low necks of lands which form a junction between the hills; it is about 30 miles long from N. to S.E.; and it appeared barren and unhabited. Some settlements were seen. N. lat. 60° 40'. W. long. 172° 30'.

GORESBIDGE, a small town of the county of Kilkenny, Ireland, 51 miles S. from Dublin, on the road to Waterford.

GORLY, a small town of the county of Wexford, Ireland, also called New Borough, which, before the Union, was represented in parliament. It is 45° 1 miles S. from Dublin, and 21 N. from Wexford.

Gorvymountains of Ireland, in the county of Donegal, near Raphoe.

GORG, a town of Mingrelia, on the Black sea; 30 miles S. of Anagrih—also, a river of Naples, which runs into the Liban, in Calabria Citra.

Gorge, in Falconry, is the uppermost bag or remach of a hawk or falcon, being that which receives the food the first.

The gorge, inglialis, is the fame, in birds of prey, with what we call the crop or crop. When the bird is fed, he is said to be gorged.

Gorge, in Architecture, denotes a sort of concave moulding, wider but not so deep as a festoon; used chiefly in frames, chimneypieces, &c.

Gorge of a Chimney, is that part between the chimney and the crowning of the mantle. Of this there are divers forms; straight, perpendicular, in form of a bell, &c.

Gorges is sometimes also used for a moulding that is concave in the upper part, and convex at bottom; more properly called gola and cynatism.

Gorge is also used for the neck of a column; more properly called colamin and gorgerin.

Gorge, in Fortification, the entrance of a Bastion, or of a Ravelin, or other Outwork. See each article.

The Gorge of a Bastion is what remains of the sides of the polygon of a place, after retrenching the curtains; in which case it makes an angle in the centre of the bastion.

In flat bastions, the gorge is a right line on the curtain, reaching between the two flanks.

Gorge of a Half moon, or Ravelin, is the space between the two ends of their faces next the place.

Gorge of the other out-works is the interval betwixt their sides next the ditch.

All the gorges are to be made defillete of parapets; otherwise the besiegers, having taken possession of a work, might make use thereof to defend themselves from the flat of the place: so that they are only fortified with palisades, to prevent a surprize.

Gorex, Half the Gorge, demigorge, that part of the polygon between the flats and the centre of the bastion.

GORGED, in Heraldry, is when a crown, coronet, or the like thing, is borne: about the neck of a lion, a swan, &c. In that case they say, the lion or cygnet is gorged with a ducal coronet, &c.

Gorged is also used when the gorge or neck of a peacock, swan, or the like bird, is of a different colour or metal from the rest.

Gorged, among Farrières, &c. signifies as much as swelled. In which sense they say, the legs of an horse are gorged; the patina-point is gorged; you must wait him out, to digorse his shoulder.

Gorged, in Rural Economy, a term which is sometimes applied to signify being beseen by fresh luxuriant green food, and relates to cattle, &c.

GORGÉRIN, a part of the ancient armour, being that which covered the throat or neck of a peron armed at all points.

Gorgis, or Gorge, in Architecture, the little freeze in the Doric capital, between the aitragal, at the top of the shaft of the column, and the annulet.

Some call it collarine. Vitruvius gives it the name hypo-

Gorget, in Military Affairs, a piece of brass or silver, worn by the officers of foot upon their breasts when on duty. The gorget hangs round the neck by a ribbon; they are sometimes gilded, and have commonly some device engraved on them, as the sovereign's, or even the colonel's coat of arms, crest, or cypher.

Gorget, an instrument used in Surgery, for the purpose of cutting an opening into the bladder, to as to enable the operator to introduce the pair of forceps and extract the stone.
It is impossible to give the reader a proper notion of the form and manner of using the gorgets, without presenting him with engravings of the instrument, and entering into a description of the operation of lithotomy. Hence, we must at present content ourselves with referring to the surgical plates, and the article LITHOTOMY.

Besides cutting gorgets, constructed for the above design, there are also blunt ones, intended to be introduced into the wound, when their concavity serves as a guide for the forceps into the bladder.

The employment of gorgets for the performance of lithotomy has been objected to by several eminent surgeons of the present day, particularly by Mr. John Bell of Edinburgh. (See his Principles of Surgery, vol. 2.) We have seen the operation most easily executed by means of a common scalpel. Mr. Atley Cooper uses, instead of a gorget, a common scalpel with a beak, which slides along the groove of the flaff into the bladder. Several other knives and instru-
ments have been at different times invented to supersede the gorget. The principal ones will be represented in the surgical plates, and due notice will be taken of them in the article LITHOTOMY.

GORGIAS, son of Aesilaus, born at Leontium in Sicily, from whence he derived his second name, was a celebrated orator and learned sophist, who flourished in the fifth century before the Christian era. He was a disciple of Empedocles, and is reckoned one of the earliest writers on the art of rhetoric. He is thought to have introduced numbers into prose, treated of common places, and thwed the use of them for the invention of arguments. Hence Plato gave the name of Gorgias to his ele-
phant dialogue on this subject, which is still extant. He was so great an orator, that in public assemblies he would undergo to declaim extempore upon any subject proposed to him. In the war between Syracuse and Leontium, the ci-
tizens of the latter applied to the Athenians for succour, and employed Gorgias and Tisias as their ambassadors, the former of whom was peculiarly qualified to influence popular assemblies by his bold and perulusive eloquence. On their arrival at Athens about the year 447 B.C., Gorgias made an oration to the people on the grievances which their countrymen suffered from the people of Syracuse, and the advantages which would accrue to them from sending a powerful army into Sicily, by which he persuaded them to rush headlong into a war, that proved in the end more fatal to them than any in which they had engaged. Afterwards he made a display of his eloquence at the Olympic and Pythian games, on account of which a golden statuette was erected to his honour at Delphi. He is said to have lived to the great age of 107 or 108.

GORGOGLIONE, in Geography, a town of Naples, in the Bafilicata; 15 miles E. of Veneda.

GORCONTA, an island of small extent and of a circular form, in the Mediterranean, about 16 miles from the coast of Etruria. The mountains, says Somnini, seem to be of the same nature with those of the continent. This island is famous for the anchovy fishery on its coasts. N. lat. 43° 22'. E. long. 9° 56'.—Allo, an island in the Pacific ocean, about 18 miles from the coast of Peru, about 16 miles in circumference. N. lat. 3° 36'. W. long. 75° 52'.


GORONIA, in Zoology, a genus of Zoophytes, the stem of which is coriaceous, woody, corky, horny, or somewhat bony, and in general flexible; the texture glairy, fibrous, or like flume, friated, tapering, fixed at the base, which is dilated, and covered with vascular or cellular fleis, or bark of a spongy and friable nature in a dried state; the mouths or cells covering the surface of the stem and bearing polyps.

These marine productions were regarded by the ancients as a class of plants, and described as such by their botanists; nor was this idea, however remote from truth, exploded till fo late a period as the eighteenth century, when the discovery of Porifonea upon the nature of coral, published in 1727, and those of Trembley on the hydra (or polype) about fourteen years after, contributed to demonstrate, in a very explicit manner, that the gorgonix in common with other zoophytes (as these particular bodies are now denominated), do not appertain to the vegetable, but animal kingdom, or are at least the fabrication and genuine habitations of animals.

Among the various observers of this curious order of animal productions, few, if any, have pursued their investigations with greater discrimination and success than Procco Volans, or our own countryman Ellis, and his friend Dr. Solander; nor indeed can we hesitate to confess that our knowledge of the gorgonix tribe has been enlarged only in a very inconsiderable degree by any of the sub-
quent authors on this subject. The latest observations tend principally to confirm the accuracy of those writers who had before assured us the gorgonix are the habitations of various kinds of polypiferous animals, each of which refides in a distinct cell; that they lie in general dormant or contracted during winter, and, like the blossoms of plants, put forth buds, and expand in their proper season, which is commonly in summer. The stem and branches of the gorgonix, which are most commonly of a somewhat horny and flexible nature, may be considered as the true skeleton of these cells of habitations, being covered with a flathy or pulpy substance, the exterior surface of which is porous. These pores are the mouths or openings of the cells in which the polypes are lodged, and it is the number, disposition, and varied structure of these, in addition to the general aspect of the plant-like cell of habitations, that constitute the most material differences by which the various species are distinguished; the figure of the animal, when it can be ascertained, forming the secondary or least important character. It may be lastly ob-
erved, that the gorgonix differ exceedingly in size, being from one to two, or perhaps three feet in height, while other species in deep bays, and similar situations of the sea, are less favourable to their growth and increase, attain to the gigantic height of ten or twelve feet, and from their number as well as magnitude; their remarkable ramose, and foliated or flabelliform appearance; interwoven structure, and coral-like texture, form a conspicuous portion of those vast submarine "groves of coral" that are sometimes seen by navigators in the hotter regions of the globe.

Species.

LEPÆDIFERA. Dichotomous, with crowded, imbricated, reflected, campanulated flores. Mill. "Gorgonia rædifta." Pal-

Native of the Norway seas, from eighteen inches to two feet high; flath pale, with whitish skin or scales; flum white, with a flomy bafe and cartilaginous branches.


From two to three feet high; flum brittle and white, with flexible branches. Native of the Mediterranean and North seas.

Placoem.
**GORGONIA.**


Height two feet; stem erect, woody, and yellow, scarlet or reddish cinereous. Inhabits the Indian and European seas.

MOLLIS.Coriaceous, dichotomous, with perpendicular tubular florets. Pallas.

Native of the Mediterranean, and about eighteen inches in height, the colour brown violet; stem brown; branches long and slender.

EXserta. Round, amber-colour, dichotomous, rigid, the stem covered with tuberous gaping florets. A very rare species, the native place of which is unknown; it is only six inches high, the stem tesselaceous.

AMERICANA. Branched and sub-divided, the divisions nearly opposite, compressed, with rows of polypterous cells on each margin; flesh yellowish, within pale purple; bone horny. Gmel. *Gorgonia pinnata, Soland. and Ellis.*

Native of the West Indies; flesh purplish or yellowish.

PATULA. Compressed, with flexuous sub-pinnate branches, crimson, with two rows of florets each side, each surrounded with a whitish ring; bone brownish, horny. Soland.

Height two feet; branches long, slender, and white; polypies with many feelers and exerted. Inhabits the West Indies.

CERATOPHYTA. Branched, with divericate erect sub-divisions, each marked with two furrows; florets white, in irregular rows; flesh purple; bone black and horny. *Gorgonia ceratophyta, Soland. Corallina fruticosa purpurea, C. Baur. Lithobyon etc. Genta. Corallina fruticosa erecta, Cateby.*

Found in the Mediterranean, Atlantic, and South American seas; height twelve inches; flesh bright purple.

JUNCEA. Stem simple, round, and tapering both ways; bone dusky, horny; flesh orange-colour, with two furrows; florets longish. Soland. &c. *Juncis lapides, Plin. Palmatuncus albus, Rumph.*

Inhabits the flores of the American islands adhering to stones; height about three feet, and very flexible when alive.

FLAMMEA. Compressed, branched, and sub-pinnated; bone flat and horny; flesh bright red, with minute florets. Soland. and Ellis.

A beautiful species, of a fiery red or flame-colour when recent; this kind inhabits the African coast, and appears to be found in most abundance near the Cape of Good Hope.

UMBRACULUM. Fan-shaped, and somewhat resculptured; branches numerous, divergent and round; flesh reddish, warted or covered with florets. Soland. and Ellis.

Native of the Indian sea; stem short, rising from a broad base, divided into about two or three branches, the smaller ones rising from which are numerous, and so intimately connected as to form a kind of net-work.

PURPUREA. Somewhat dichotomous, with divaricately slender branches; flesh violet and sub-verrucosel. Pallas.

Round, smooth and blackish, with the extremities of the branches yellow. A South American species.

**SAEPPO.** Sub-dichotomous, round, with divaricated slender branches; flesh red, with numerous hairy florets. Pallas. *Acorbana saeppe, virga fungina, Rumph.*

About twelve inches in length, the texture horny, and colour black. The branches are frequently adhering to this species.

**PALMA.** Flat, with numerous very long and simple divisions; flesh smooth, sprinkled with spongy pores. Pallas. *Chamaeripha peregrina, Chius.*

Grows to the height of five feet, though more commonly not exceeding two or three feet; the substance horny, covered with a calcareous coating, and flexible. Inhabits the Indian ocean.

**RADIATA.** Very much branched, and corky; with minute scattered pores, and many-leafed at the base. Pallas, Seba, &c.

Native of the African seas; sub-dichotomous, grey, with branched trunk, and in substance resembling cork.

**SUBEROSA.** Woody, very much branched, diffuse, the branches compressed and grooved, and covered with tuberculated scattered pores. Pallas.

Height three feet; flesh red, spongy; bone pale red and corky; branches long, round, and erect. Found in the Indian and African seas.

**CORALLOIDES.** Woody, erect, sub-dichotomous, and variously formed; flesh tuberous, with elevated tuberculated florets. Pallas. *Corallina ligna incrusta, Bocci.*

Native of the Mediterranean; length one foot, very tough, pale grey; with yellow florets.

**ELONGATA.** Dichotomous, divaricate, with the flesh red, and covered with papilliferous sub-incrustated pores. Gmel. &c.

Pole and brittle, with square branches with pores at the angles; grows to the height of four feet, and inhabits the Atlantic.

**SCIREEA.** Very simple, straight, with a decomposit leafy base, and soft tuberculated flesh. Pallas.

Fuscous, tapering towards the tip; the flesh cinereous when dry; inhabits the Indian seas.

**SETACEA.** Simple, rigid, with calcareous white sub-tuberculated flesh. Pallas. *Ifidae placumum, Mercat.*

Native of the American ocean.

**VIMINALIS.** Very long, depressed, branched, with erect sub-divisions; flesh yellow; florets seated along each margin of the branches, and rather prominent. Pallas. *Ifidae placumum., &c. Mercat.*

Height eight inches; branches long and slender; bone blackish and horny; florets white; the polypies furnished with eight feelers or claws. Native of the Atlantic and Mediterranean.

**MELICATA.** Round, with depressed sub-divided branches; flesh thick; pores cylindrical and spinous. Pallas, Ellis, etc. *Epectoralia, &c. Petiv. Lithophrones, Tournef.*

Native of the American islands; height from two to three feet; coriaceous, horny, with a whitish medullary nerve.


Inhabits the West Indian, Mediterranean, and rarely the British seas, adhering by the broad base of the principal trunk to the rocks, and rising to the height of twelve or fifteen
fifteen inches, and sometimes rather more, in a fan-like form; colour when dry greyish-white; bone of a texture between horn and wood.


Grows to the height of two feet, and inhabits the Indian and Mediterranean seas. This is the black coral of the fleet.

Novae-Hollandiae. Dichotomous, the branches somewhat tapering; flesh red, slippery, and soft; the surface speckled with numerous eight-valved, conic, and rather elevated, irregularly disposed pores; bone bright red, striated, and slightly punctured externally. Soland. and Ellis, Corallum nodosum, Linn. Synt. Nat. X. Meduspara rubra, Linn. Synt. Nat. X. Pallas. Corallum rubrum, Donast. Red coral, Ellis.

The bone of this species constitutes that beautiful and much esteemed marine production, the red, or true coral of the jewellers. The coral is a general inhabitant of the Mediterranean, Adriatic, and Red seas, and appears to be no where more abundant than in the sea about Marseille, Corfes, Sicily, and the coast of Africa; in the vicinity of Barley, the coral fisheries in those parts being carried on with great spirit, and proving highly lucrative. From the observations of Donast, an author who has devoted much attention to this curious subject of enquiry, we understand that the flesh or exterior covering of the coral is of a red colour, varying from bright to paler hues, the tint of which is uniformly less brilliant than that of the bone of the coral itself. The most prevalent colour of the bone is red, exhibiting all the tints from a pale rose colour to fiery scarlet, and sometimes inclining to yellowish or fine fialen. The coral grows in a shrubby form, and not infrequently in an inverted form, to the height of a foot or eighteen inches, which latter it rarely exceeds, nor is the circumference of the largest branches more than one inch. Externally the surface is frizzled, more or less nodulous or warted, and the substance when broken appearing composed of a number of concentric layers. The coral of this species is equal in hardness and durability to the most compact marble, and of material qualities, in addition to its beautiful texture or grain, and colour, have contributed to render it valuable in the embellishment of the world from the earlier ages, as we learn from Pliny, and other writers of remote antiquity. At this day the true coral bears a considerable price throughout the East as well as in Europe; its supposed medicinal virtues have, however, fewer vatrates at present than formerly. The polyps, by which the cells are occupied, are furnished each with eight arms or tentacula, in the centre of which the mouth is situated; these arms are retractile, contract immediately on being touched; the cells or pores are filled with a white liquor, and the polyps are likewise white.


Inhabits the American seas, and some of the European seas; height nearly two feet; bone roundish, tapering to the ends, and violet when recent.

Crasa. Round, dichotomous, with long, thick, divaricated, erect branches; flesh thick, violet, with small prominent, approximate, equidistant pores; bone dark brown and horny. Soland. and Ellis.

Native of the American seas.

Pinnata. Rather compressed and pinnated, with very simple compressed branches; flesh red with oblong pores. Linn. Palma pelagica, Theophr. Lithophyton, Breyn.

Grows to the height of from one to four feet; the texture horny and brown. the branches yellowish. Native of the African and North seas.

Sanguinolenta. Depressed, very ramose, and pinnated; flesh yellow, with purple pores in double rows. Pallas. Lithophyton sanguinolentum, Tournef.

Native of the Atlantic and Mediterranean seas; height one foot.

Vulcania. Rather depressed, with pinnated branches; flesh violet; nearly square, with somewhat prominent pores. Gmel. Phorusrum, Theophr.

Inhabits the American seas, above a foot long, and horny.


Grows to the height of two feet; very upright, and inhabits the Mediterranean and American seas.


Native place unknown; bone horny, black, with amber-coloured ramifications.

Ptyconata. Round, with parallel ascended simple branches; flesh red, with gibbous scattered pores; bone white, hard, and brittle. Gmel.

Very rare, white, with red flesh; found in the Indian ocean.

Adpressa. Ramose pinnated; flesh yellow, with rows of purple florets each side; bone horny and yellowish. Soland. and Ellis.

Native of the African seas, and seldom exceeds a foot in height.

Calyculata. Dichotomous and subdivided, with creft thick ramifications covered with truncate papillae; flesh cinereous, with purplish; cells large and cup-shaped; bone dark brown and horny. Ellis.

Inhabits the American seas.

Brilareus. Subramose, round, thick; flesh pale or white within, externally cinereous; bone composed of small purple glossy needles, irregularly and closely disposed longitudinally. Soland. and Ellis.

Cells large, prominent, numerous, and irregularly disposed; the species inhabits the West Indies.


Black or brown; the species inhabits the Indian ocean.

Reticulatum. Reticulated, branches with very close ret and round ramifications, and red tuberculated bark.

Very ponderous, of a grey colour, and inhabits the Indian ocean.

Clathrus. Reticulated, woody; with round ramifications; flesh smooth with simple pores. Pallas.

Native place unknown; about eight or ten inches in height, pale, with a thin reddish-grey flesh.


The bone is black, horny, and slightly filariated on the larger branches.

Found adhering to various substances, and varying in colour.
colour from yellow to purple: this species inhabits moist
fens.

**GORGONIUM**, in *Botany*, a name given by some
authors to the common eryngium or eryngo, the roots of
which we use candied.

**GORGONS**, in *Antiquity and Mythology*. Authors are
not agreed in the account they give of the Gorgons. The
poets represent them as three sisters, whose names were
Stelena, Eurystyle, and Medusa, the daughters of Pheorus
by Ceto; the latter of whom was mortal; and having been
decked over by Neptune, was killed by Perseus: the two
former were subject neither to age nor death. They are
described with wings on their shoulders, with serpents round
their heads, their hands were of brass, and their teeth of a
prodigious size; so that they were objects of terror to
mankind. Æschylus, in his Prometheus, adds, that they had
but one eye and one tooth among all the three, which they
made use of one after the other, and that they killed men
with a single glance of the eye.

Pindar (Pyth. 12.) improves upon Æschylus, and
heightens the fable by these circumstances, unknown to his
predecessors. The first is, that the Gorgons turned those
into flame whom they looked upon, and that it was by this
kind of death that Perseus, in presenting Medusa's head,
debated the island of Seriphus, whose inhabitants he petrified,
together with their king. The second is, that Minerva,
who aided Perseus while he was struggling with Medusa,
being surprized with the melody of the Gorgons' sigis,
together with the evils of their serpents, felt certain charms
in that mixed composition of dreadful accents; and to renew
the idea of the harmony, she invented a flute in imitation
of it, which she imparted to men; and in allusion to its
first model she called the various sounds it produced "a
Harmony with many heads." The third is, that Phorcys,
whom Hesiod represents as having taken flight to the
mountain of the gods, was afterwards broke by Minerva,
and given to Belcherphon, who mounted him to combat the
Chimæra; but that hero having attempted to ascend to
heaven on the wings of that horse, was thrown down to the
cave, and Phorcys placed among the stars. (Pindar's *Ol. in.
Pyth. vii.*) The Latin poets, though faithful copies of the
Greek ones, have yet altered the fable of the Gorgons
with new circumstances. Homer had said, that the Gorgon's
head was engraved upon the tremendous *Egis* of Minerva.
Virgil adds, and upon her entrails too, in the place which
covered the goddess's breast:—

"Iphamque in pectore Dire
Gorgon detecto vertament humma colo." *An. l. viii.*

After the death of Medusa, her sisters, according to
Virgil, were appointed to keep the gate of the palace of
Pluto:

"Multaque preterea varianum monstra ferarum—
Gorgones, Harpeaque—" *An. l. vi.*

Ovid of all the poets has more enlarged upon the fable
of the Gorgons, and added several particulars which are only
found in his Metamorphoses, 1. iv. and v.

Diodorus Siculus will have the Gorgons and Amazonis to
have been two warlike nations of women, who inhabited
that part of Lybia which lay on the lake Tritonis. The
extermination of these female nations was not effected till
Hercules undertook and performed it.

Paulinus says, the Gorgons were the daughters of Phor-
bus, probably by mistake for Pheorus; after whose death,
Medusa his daughter reigned over the people dwelling near
the lake Tritonis. The queen was particularly fond of
hunting and war, so that she laid the neighbouring countries
quite waste. At last, Perseus having made war on them,
and killed the queen herself, when he came to take a view
of the field of battle, found the queen's corpse to extremely
beautiful, that he ordered her head to be cut off, which he
carried with him to show his countrymen, the Greeks, who
could not behold it without being struck with astonish-
ment.

Others represent them as a kind of monstrous women,
covered with hair, who lived in woods and forests. Others,
again, make them animals, resembling wild sheep, whose
eyes had a poisonous and fatal influence.

Xenophon of Lamprocus, who is followed by Pliny and
Solinus, was of opinion, that the Gorgons were female va-
vages, who inhabited the islands Gorgades. Hanno, the
Carthaginian general, penetrated as far as these islands, where
he found women, who, in twain, outran the flight of birds.
Gerard Vofius, in his "Origin and Progress of Idolatry," is
perceived, that the fable of the Gorgons took its rise from the
relation of Hanno the Carthaginian general, above cited,
from Xenophon of Lamprocus. Le Chere, on the contrary,
in his notes upon Hesiod, takes them for the nays of Ly-
bria, which the Phoenicians in a voyage to Africa had taken
away. Bunier (Mythol. vol. iii.) is of opinion that the Gor-
gons dwelt in that part of Libya which was afterwards
called Cyreneum; and that Phorcys, their father, had con-
quered Ithaca, which was not far from the coast of Africa,
where he refided. It is not incredible that this prince would
employ his fleet in carrying on an advantageous trade, and
that Polydeuces, king of Seriphus, in order to get rid of
Perseus, gave him some ships for the purpose of pirating on
the coasts of Africa. Perseus accordingly, thus equipped,
failed from the isle of Seriphus for the coast of Lybia, and
having fallen in with the fleet of Phorcys, made himself
master of some of his ships and a part of his riches. These
ships, it is said, bore the names of Medusa, Stheno, and
Euryle. They were loaded with the teeth of elephants, the
horns of felines, and the eyes of hyenas, which Phorcys bar-
tered for other goods. This, it is said, is the mystery of
the tooth, horn, and eye, which the Gorgons borrowed by
turns; that is, the ships, when arrived in the port, took
each of them goods proper for the place to which they were
bound. The other fables that accompany this history,
says the author now cited, will explain themselves.

A further account of them, p. 72, seq. See Medusa caput.

**GORGONZUOLI**, in *Geography*, a town in Italy, in
the department of the Olt, 10 miles N.E. of Milan.

**GORGORA**, an island of Abyssinia, in the lake Deobes
(which see), where a palace was built, which is the usual
residence of the emperor in winter.

**GORHAM**, a port town of America, in Cumberland
county and state of Maine, on the N.E. side of Saco river,
130 miles N.E. from Boston; incorporated in 1704, and
containing 2053 inhabitants.

**GORIO, ANTONY FRANCIS**, in *Biography*, a learned
antiquary of the eighteenth century, a native of Florence,
was author of the following works, *viz.* "Museo Floren-
titum," or a description of the cabinet of the Grand Duke,
eleven volumes folio, with a great number of plates:

**GORTIZ, or GUNEZ**, in *Geography*, a county of Ger-
many, in the circle of Austria; bounded to the N.E. and S.
by the duchy of Carniola, and on the W. by the Venetian
states. The chief produce of the country consists of wine
and fruit, with some corn and silk; the horses and oxen are

502, few,
few, but the goats are numerous. The language of the country is Schlesische, and the religion Roman Catholic.

**GORLIA** or **Gooralia**, a town of Germany, situated in the above-mentioned country, and divided into Upper and Lower towns. The former is ancient, seated on a mountain, and defended by a castle; the latter is situated on a plain on the river Limaz. Besides the church, since the year 1784, not of the metropolis, it has seven convents, nine chapels, and a college. In 1797 it was taken by the French: 20 miles N.N.W. of Trieste. N. lat. 46° 5'. E. long. 13° 35'.

**GORE**, a town of Brandenburg, in the New Mark, seated on the Oder, formerly the metropolis of the circle of Leading.

**GORKA**, a town of Hoithoofdan, in Meck.; 12 miles S.S.W. of Cottibah.

**GORKALL**, a town of Asia, situated in the N.E. part of the island so called, on the borders of Napaul; 35 miles N.W. of Cantamun. N. lat. 28° 25'. E. long. 84° 36'. The country lies between the province of, Oude and Tibet, and is governed by a rajah dependent of Tibet. — Alto, a town of the duchy of Warfaw; 40 miles S. of Posen.

**GORLEUS, ABRAHAM**, in *Biography*, a celebrated medallist, was born at Antwerp in 1550. He devoted himself entirely to the collection of ancient medals, seals, rings, and other curiosities. He died at Delft, where he spent the greatest part of his life, in the year 1629. His works are entitled *Dactyloheza ferr Asseborum Sigmorique*, &c. Ferro, Argento, atque Auro Promptuum. "The Laurus Numismatum Familiarum Rom. ("Paralipomena Numismatum.") His works are highly valued by those who are addicted to these studies. — Moreri.

**GORT, Z.,** in *Geography*, a town of Upper Lusatia, situated on the river Neisse, and the first town in the county with regard to size, population, and wealth. Within the walls it has three churches, and as many without. The principal trade is brewing, with woollen and linen manufactures. 50 miles E. of Dresden. N. lat. 51° 9'. E. long. 15° 31'.

**GOROCHOVETZ, a town of Russia, in the government of Vladimir; 72 miles E. of Vladimir. N. lat. 50° 10'. E. long. 42° 34'.

**GORDITSCHE** or **Goritsche**, a town of Russia, in the government of Penza; 32 miles E.S.E. of Penza. N. lat. 53° 20'. E. long. 49° 34'. — Alto, a town in the government of Kiev, 112 miles S.E. of Kiev. N. lat. 49° 3'. E. long. 34° 16'. — Alto, a town in the government of Tobolsk, 20 miles E.S.E. of Enibolk.

**GORODNIA**, a town of Russia, in the government of Tver, on the Volga, 23 miles E. of Tver.

**GORODNITZSK, a town of Russia, in the government of Tchernigof, on the Sow; 32 miles N.N.E. of Tchernigof.

**GORODOK**, a town of Russia, in the government of Polotsk; 36 miles E. of Polotsk. N. lat. 55° 36'. E. long. 29° 54'.

**GORON, a town of France, in the department of Mayenne, and chief place of a canton, in the district of Mayenne; 9 miles N.W. of Mayenne. The place contains 1860, and the canton 12,733 inhabitants, on a territory of 200 kilometres, in 11 communes.

**GORONGO, a small island in the East Indian sea; 20 miles S. of Gilolo. S. lat. 1° 8'. E. long. 128° 35'.

**GORONPALE, or Gorontano, a town on the E. coast of the island of Celebes.

**GORPET, a town of Hindoostan, in Birar; 24 miles W. of Chunar.

**GORSE, JOHN D.,** in *Biography*, was born at Paris in the year 1805. He took the degree of doctor of physic in that city about 1540, and was appointed dean of the faculty in 1548. He is said to have performed both the learning and fertility requisite to form an accomplished physician, and to have practiced with great humanity and success. His works contributed to support this reputation. The greater part of them consists of commentaries on different portions of the writings of Hippocrates, Galen, and Nicander. During the civil war, which was fatal to numerous men of letters, John de Gorse was stopped by a party of soldiers, when on his journey to Melsbu to visit the bishop of Paris, and the fright which he sustained is said to have deprived him of his reason. This occurred in 1561, and he lived many years in this deplorable condition, having died at Paris in 1577, at the age of 72.

His father, also John de Gorse, was a physician at Bourges, attained considerable eminence, and left two works, one on the general "practice of medicine," dated 1555; the other, a "collection of formulas," 1568, both in Latin.

**Elyo Dict. Hist.**

**GORRITLI, in Geography, a small island in the river La Plata.**

**GOSA, a small island near the S. coast of Cuba. N. lat. 21° 43'. W. long. 81° 21'.

**GORME.** See *Furme* and *Ulrex.*

**GORSIO, in Geography, a town of Sweden, in Hellingland; 8 miles W. of Hadingwickswal.**

**GORT, a small town of Ireland, in the county of Galway. It stands on an eminence, and is a dirty straggling town, but can boast of a few good houses. Adjoining to it are the ruins of a castle, and near it is Kilmadeagu, the seat of a bishop. Gort is 98 miles W. from Dublin.**

**GORTER, JOHN D., in Biography, a physician, who, after having been a disciple of the celebrated Boehmave, became a distinguished teacher of medicine at Hardwick, his native place; in consequence of which he was elected a member of the academies of Peterburgh, Rome, and Haelere, and obtained the title of physician to Elisabeth, empress of all the Russias. He was the author of several works, which are written with excellent method, and contain many interesting and original observations. He died on the 11th of September, 1762, at the age of 72.—His works, the titles of which are enumerated by Elyo, relate to physiological and practical subjects, as well as to the practice of the ancients. Elyo Dict. Hist.**


Gen. Ch. *Common calyx* of one leaf, imbricated with spiny scales, the innermost gradually longer, straight, bristle-shaped, rigid. *Cor.* compound, radiated. Flores of the disk numerous, perfect, with a funnel-shaped five-cleft corolla: those of the radius fewer, female, with a ligulate lacinolate one. *Stam.* (in the perfect florets only) Filaments five, short; stamens united into a cylindrical tube. *Pis.* (of the perfect florets) German hairy; filiform thread-shaped, the length of its own little corolla; stigma clavate. In the female florets the germen is oblique and abortive; style none; stigma none. *Peric.* none, except the calyx, falling.
off entire. Seeds to the perfect florets only, solitary, roundish. Down simple or woolly. Receptacle naked. E.T.C. Receptacle naked. Down simple or woolly. Florets of the radius ligulate. Calyx of one leaf, clothed with imbricated scales. All the plants ranged under this genus are natives of the Cape of Good Hope. In the 2d edition of Linnaeus's Species Plantarum, where it first appears, are five: *perfonata, Jacq.* Coll. v. 4, t. 21. f. 1; *rigida, Curt. Mag. t. 92; squarrosa, citrina, and fruticosa.* The latter is the same plant as *G. alicivale, Linn.* Suppl. 381, but different from *Arzidias oppositifolia,* under which it is quoted in Synth. Veg. ed. 12 735. To the above are added, in the Manilla, p. 287, *G. fistula;* and in the Suppl. iuxta mixere more, *herbaea, bispicata, frutesco, corona, uniflora,* and *bordota.* Of these the *bordota* is there suspected, to be a mere variety of *rigida.* The genus thus understood undoubtedly forms a very minute and elegant tribe of flowering plants. *Linnaeus having chiefly considered the simple-leaved *cucumis* of the *Geraniaceae* family, remarked. Wilder, accordingly, has but seven *Gortynia,* the *perfonata, rigida,* and *corona* of *Linnaeus,* with *squamia, integri folia,* and *blattis* of *Thunberg.* Others are lent to his genera of *Mug- *ficus,* *Cnidosocium,* *Cygnum,* and *Zygophyllum,* whose receptacles are villosa, and feed-down, formed of simple hairs; and *Drege's* whole receptacle and feed-down are chaffy. Among the Later are the beautiful and truly wonderful *G. citrina,* and the *fusca.* the latter figured in Jacq. Hort. Schonbr. t. 572. This is doubtless a great improvement, but it seems to us that the genus maia, after all, chiefly depend on *G. perfonata,* which is an annual plant, of no beauty, with many spreading *flora,* about a foot high. *Leaves* alternate, spatulate, revolute, pinatitudine undivided; very white and corymbaceous beneath; and green and bristly, like the *flora,* above. *Flowers* solitary, terminal, small, yellow, with numerous prominent spines to the calyx. The *flora* are crowned with wood, but have no proper *pappos* or *feed-down.* The leaves of *G. rigida* bear some analogy with this, but the large orange blossoms, unarmed calyx, and long simple feed-down, urge the propriety of separating it. The latter is *Lamarck's Gortynia* above quoted.

**GORTYNA, or GORTYN, in Ancient Geography, an inland city of Crete, being, according to Strabo, near 93 furlongs distant from the African sea, or that part of the Mediterranean which bordered the southern part of the island. Its origina is obscure, some ascribing it to Gortyn, the son of Rhadamantus, and others to Taurus, who carried off Europa. In process of time, however, it eclipsed all the other cities of Crete, especially after the island was reduced by the Romans. Of its ancient splendour and magnificence we may form some judgment from its ruins, which are still visible about six miles from mount Ida; though many of them have been carried away by the Turks. In ancient times it was famous for the temples of Apollo, Diana, and Jupiter Hecatombus, so called because Memnon there sacrificed to Jupiter 100 oxen, when he received information of Helen's flight. Its walls were washed by the river Lethe. Theophrastus, Varro, and Pliny speak of a plane tree near Gortyn, which never lost its old leaves till new ones sprout forth.**

**GORTYNA, a town of Greece, in the northern part of Macedonia.**

**GORVAY, in Geography, a town of Hindookept, in Balh, 62 miles W.S.W. of Balk.*

**GORZ, a town of Georgia, in the province of Carduel, on the Kura; 45 miles W. of Teltis. N. lat. 41° 55'; E. long. 44° 30'.**

**GORZE, a town of France, in the department of the Meuse, and chief place of a canton, in the district of Meus,* 7 miles S.W. of Metz. N. lat. 49° 3'; E. long. 6° 4'. The place contains 15,355, and the canton 14,278 inhabitants, on a territory of 330 kilometres, in 31 communes.**

**GORZEGNO, a town of France, in the department of the Savoy, on the Rhone; 13 miles S.E. of Alba. N. lat. 44° 28'; E. long. 8° 7'.
The word is Saxon, and of the same form with the Latin term evangelium, or the Greek εὐαγγέλιον, which signifies glad tidings, or good news; the history of our Saviour being the best history ever published to mankind. This history is contained in the writings of St. Matthew, St. Mark, St. Luke, and St. John, from thence are called Evangelists. (See each of these articles.) The Christian church never acknowledged any more than these four gospels as canonical; notwithstanding which, several apocryphal gospels are handed down to us, and they are entirely false. We shall here refer in the titles of some of the principal of apocryphal gospels, as we find them in Jones’s Canon, and Lardner’s Works, with remarks that will serve to enable us to distinguish them from our four gospels, the authenticity of which is excused under other articles in this work. (See Bible, Canon, and Testament.) Several of these spurious gospels are mentioned in the decree, ascribed to pope Gelasius, in the council of Rome, A.D. 494, which pronounced them to be apocryphal. The gospel of “Andrew the Apostle” is only mentioned in this decree. No fragments of it are extant, nor are there any testimonies concerning it. The gospel of “Apelles” is not mentioned by any writer before Jerom, who places it among the apocryphal pieces of the New Testament. Apelles was a disciple of Marcellus, bishop about the year of Christ 180, and is supposed to have formed this gospel out of the true and genuine gospels for the use of his followers at the close of the second century. The gospel, “according to the twelve apostles,” is mentioned by Origen, Ambrose, and Jerom, but they unanimously come to this conclusion, and in expressly affirming that the church received only these four gospels. Jerom supposes this to have been the same with the gospel according to the Nazarenes. The gospel “according to St. Barnabas” is not noticed by any of the Christian writers of the first four centuries; nor do there seem to be any fragments extant, that unquestionably belong to it. Mr. Jones apprehends that this was merely some interpolated corrupted gospel of St. Matthew. The gospel of “Bartholomew” is mentioned by Jerom as apocryphal, and Jones, for reasons which he alleges, inclines to think, that it was the same with the gospel of St. Matthew, used by the Hebrews or Nazarenes. M. Daille is of opinion that it was forged but a very little time after Gelasius. The gospel of “Ballilides” is named by Origen, Ambrose, and Jerom, among the apocryphal books of the New Testament; but no fragments of it remain. The gospel of “Corinthus” is mentioned only by Epiphanius in connection with an exposition of the first words of St. Luke’s gospel, as many other Christian writers notice the apocryphal books; and it seems probable, from the similarity of the opinions adopted by Corinthus and the Ebionites, that the gospel of Corinthus and his followers was no other than the Ebionite or Nazarene gospel, i. e. the gospel of St. Matthew corrupted and interpolated, in Hebrew. The gospel “according to the Egyptians,” was one of the most celebrated apocryphal books, and supputed even by several modern critics to have been a faithful compendium of some Catholic Christians in Egypt, before either of the four canonical gospels now received. The first Christian writer who cites it is Clement Alexander, who, however, rejects it, though some have supposed that a passage in the second epistle of Clement Romanus to the Corinthians is taken from this gospel. It is mentioned by Origen, Jeron, and Epiphanius among apocryphal books. Many modern writers, as Abaris, Grolius, Grotius, Mill, suppose, that it is referred to in the introduction to St. Luke’s gospel, and therefore that it was prior to his; andDupin and P. Simon think, that though it is not of the same authority with the four canonical gospels, it ought not to be rejected. Mr. Jones is of opinion, that it was composed by some very early heretics to support their doctrines of celibacy and abstinence, and very probably by those of Egypt; and Dr. Lardner thinks that it was not written before the third century. The gospel of the “Ebionites” was either altogether, or very nearly, the gospel of the Nazarenes. The gospel of the “Encratics” has been mentioned by Fabricius and some others, but there is reason for doubting whether any gospel was ever called by this name. The gospel of “Eve” has been mentioned by several modern writers, but only by Epiphanius among the ancients; it was, without doubt, a forgery of the Gnostics. The gospel of the “Hebrews” was the fame with that of the Nazarenes. The gospels of “Hesychis” were some interpolated copies of our received gospels. The gospel of “Iudas Icariot” is mentioned by Irenaeus and Epiphanius as peculiar to one of the most monstrous and inconsistent sects that ever affumed the Christian name. The false gospels of “Lucius,” who was a famous scribe and martyr under Diocletian, were, like the half-mentioned, corrupted, interpolated copies of our present gospels. The gospel of “Matthius,” of which there are now no remains, is mentioned by several of the most celebrated writers among the ancients, e. g. Origen, Eusebius, Ambrose, and Jerom; but they all represent it as apocryphal. The gospel of “Marcion” is taken notice of by Tertullian and Epiphanius, but it appears to have been one of our own gospels, mutilated and altered; probably that of St. Luke, from which he took away entirely the two first chapters, and many other parts, inverting many things of his own, with a view to favour the opinions he had adopted. The gospel of the “Nazarenes” or “Hebrews” is the most famous of all the ancient gospels. Some have supposed that St. Paul refers to this gospel, Gal. i. 6. It is cited by Iginatius, as some have supposed, by Clemens Alexander, by Origen, by Eusebius, by Epiphanius, by Jerom; and it is mentioned by Bede, Sixtus S Ensifis, Baronius, Caelianus, Grotius, F. Simon, Dupin, Grab, Toland, Nye, Richard Mill, Fabricius, Manger, and other modern writers. However it is alleged, that this gospel was never received by any primitive writer as canonical, nor was it cited or appealed to, as of any authority, by any one writer of the first four centuries; and moreover that it was composed out of St. Matthew’s and the other authentic gospels, with additions of some other things received by oral tradition. It is allowed, that it was an early compendium, and Mr. Jones says, that it was undoubtedly extant in the beginning of the second century, and seems to have been made by some converted Jews, to favour their notion of blending judaism and christianity together. “As many mistakes,” says Dr. Lardner, “have been entertained about the gospel according to the Hebrews,” it may not be unbecoming to observe here, that probably it was an Hebrew translation of St. Matthew’s original Greek gospel, with additions from the other gospels; to which possibly might be added some few particulars received by tradition from the early Jewish believers.”
believers." (See Ebionites and Nazarenes.) This excellent writer elsewhere observes, it is not necessary for us to suppute, that the ancient fathers who mention other gospels, thought, "that all, if any of these gospels, were written before St. Luke's, or that he spoke of them; for Balaides and Apelles could not write gospels before the second century: and they might suppute, that several, if not all the others, mentioned by them, were written after St. Luke's. The meaning of what the ancient writers say is, that the church receives four gospels only. There were many others. But to them may be applied the words of St. Luke; they only took in hand, or attempted. They did not perform, as Matthew, and Mark, and Luke, and John did. And they might express themselves in that manner concerning gospels written after St. Luke's, as well as before it."

The gospel of "Peter" has been taken notice of by many of the ancient writers, as Sera-phon, Tertullian, Origia, Eut- fcbius, and Jerom. Some have supputed, that this was the gospel of St. Mark, who was the companion of Peter, and wrote the gospel now extant under his name. But there is reason for believing that the gospel of Peter was different from that of St. Mark. It is not very certain by whom it was forged. Dr. Grabe, and after him, Dr. Mill, suppute it to have been made by Luccius, whom they reckon to have been a heretic of the second century; but Luccius did not live till the latter end of the third, or the beginning of the fourth century; whereas this gospel appears to have been extant in the second century, as we may infer from the account of it by Sera-phon, who was bishop of Antioch in the 11th year of the emperor Commodus, i.e. A.D. 190. Mr. Jones apprehends, that this gospel was composed by those ancient heretics in the second century, called Docet (see that article); and he conjectures that the gospel of Balaides above-mentioned, was either wholly, or in a great measure, the same with this apocryphal gospel under the name of Peter. The gospel of "Perfection" was one of the numer- ous forgeries of the Gnostics, who pretended to a greater perfection in knowledge and virtue than all others, and hence took their name. (See Gnostics.) The gospel of "Philip" was another forgery of the same perfons. The gospel of "Scythianus" was composed by him who was the fource and author of the Manichean hereby. The gospel of "Tatian" was no other but a harmony of four gospels, or a fort of epitomes of the whole history contained in our four gospels. The gospel of "Thaddaeus" is merely mentioned in the decree of pope Gelasius. The gospel of "Thomas" or the gospel of the "Infancy of our Saviour," is mentioned by Origen, Eut- fcbius, Cyril, Ambrose, Athanasius, and Jeron, and is unquestionably apocryphal; though this is different from the gospel of Thomas, one of the followers of Manes, the head of the Manichees, for Origen, who mentions the former, lived a considerable time before the Mani- chean hereby was divulged. The gospel of "Truth" was a forgery of the Valentians in the second century. This is suppted by some to be the same with the gospel of "Valentine," but others are of opinion that he had a gospel of his own, different from that called the gospel of Truth used by his followers. For further particulars we refer to Jones's Caxon and Lardner's Works.

GOSPINI, in Geography, a town of the island of Sar- dina; 24 miles S. of Orifagni.

GOSPORT, is a sea-port town of Hampshire, England. In the time of king Henry VIII., when Leland visited this part of the island, Gosport was only a poor village inhabited by fishermen; but it has gradually become a town of con- siderable extent and importance; and of late years has been regularly fortified on the land side by a line of battions, re- douts, countercarps, &c. that extends from Wobul to Stoke, or more properly, Alverstoke. Within the works on the Wobul side, are the king's brewery and cooperage, with an immense range of florehouses for wine, malt, hops, &c. This place communicates with the sea by means of a large basin and canal, with extensive quays, where vessels of considerable burthen can take in their stores. Many small boats belonging to Wobul are employed in the conveyance of wine, beer, and water, to the ships in the harbour. On the Wobul side are also the new barracks, an extensive range of buildings, with every convenience for a great number of soldiers. Gosport, considered as a sea-port, is handsomely built, and the police well regulated. The town is a chapelry to the neighbouring village of Alverstoke, the chapel is a spacious edifice, standing in a large well- planted cemetery, to the south of the town; the interior is neat, and dappled into a middle and two side aisles. The workhouse for the poor is a large, airy, and commodious building. Here are also several charity-schools; and some almshouses for distressed widows. The markets are held three days weekly, and are much frequented, and vegetables are sold in great abundance; the latter being brought, not only from a considerable distance inland, but also from the Isle of Wight. Two fairs are held annually. Several breweries are established; and a very extensive iron foundery, where numerous articles are manufactured for government. Gosport is 73 miles distant from London; the population of the parishes of Alverstoke, including the inhabitants of this town, was returned, under the act of 1821, at 11,295; the number of houses being 1926. The connection between Gosport and Portsmouth is preferred by numerous ferryboats that ply across the harbour, which is this place is about three quarters of a mile in width.

At a small distance south of Gosport, is the Royal Hospital of Hauler, built between the years 1746 and 1762, for the reception of sick and wounded seamen, on the earnest recommendation of the late earl of Sandwich. It is situated within 400 yards of the extremity of the point of land which bounds the west side of the entrance to Portsmouth harbour; and consists of an extensive front, and two wings, each comprising two distinct ranges of buildings. In this hospital upwards of 2000 patients can be accommodated; the regular expense of the establishment in salaries, &c. is above 5000l. annually.

Nearly a mile south-west from Hauler hospital is Fort Monkton, a modern and regular fortification, exceedingly strong, and defended by thirty-two pieces of heavy ordnance; to the westward, ranges a strong redoubt; and this, together with the fort, effectually protects this part of the coast. On the shore, to the easterly, a high and massive stone wall has been erected, to preserve the land from the ravages of the sea.

Near the extremity of the neck of land which terminates the entrance of the harbour on the east side, is the Block house, a very strong fort, defended by a formidable battery. Beauties of England and Wales, vol. vi.

GOSFORT, formerly called Appleford, is a fishing town of America, on Star island, belonging to Rockingham county, New Hampshire, containing 85 inhabitants; about 12 miles E.S.E. of Piscataqua harbour.

GOSS, in Rural Economy, a term occasionally applied to the common whin in different places, and which is sometimes written goose. See Flax.

GOSSAINGUNE, in Geography, a town of Hin- donhouse, in Oude; 15 miles S.E. of Lucknow.

GOSSAMER is the name of a fine filzy substance, like web.
cobwebs, which is keen to float in the air, in clear days in autumn, and is more observable in flubbed-fields, and upon furze and other low bushes. This is probably formed by the flying spider, which, in traversing the air for food, floats out these threads from its anus, which are borne down by the dew, &c.

GOSSEMPINUS, a name given by Pliny and the ancients to a tree growing in the East Indies, which produced a fort of cotton, the threads of which were too short to be spun or carded; so that it served only for the fillings of beds and the like, for which it was very proper, being very light and soft. It was in some esteem in medicine also, to recall the heat and spirits into parts to which it was applied. It is called by Piño arbó fiber lincérea, the wool-tree, and had its ancient name from the words gypsun, cotton, and pinus, the pine-tree, being somehow like the pine in external appearance, yet bearing a fort of cotton.

GOSSE-ABDIALI, in Geography, a town of Nuba, on the Tenezé; 90 miles S. of Jazan.

GOSSEC, M. in Biography, a voluminous French musical composer of the old school, almost the only linear descendant of L'Alfi and Rameau. He had force, fire, and knowledge; but his style was not of that of the present day, either in Italy or Germany, nor could his friend, M. Laborde, persuade us, that "true genius is in need of no school or model. In whatever nation a man of genius may be born, he will make himself known, and not march with his firmens, though without a guide, in the road to glory. Celebrated schools cannot give genius, that is the boon of nature, and nature wants no school." Essais sur la Mus.

Unluckily, nature alone has never made an artist. A good painter, poet, or musician can never be made without education, study, and models. Ingenious works have been produced by the dyes of genius, but never faultlessly. The awkwardness of self-teaching will always appear; and taste, elegance, facility, grace, and often learning, will be wanting to render them perfect.

GOSSEINS, in Geography, a town of Thibet, on the Dwesh. N. lat. 30° 30'. E. long. 81° 24'.

GOSSELIES, a town of France, in the department of Jemmap, and chief place of a canton, in the district of Chalkroy. The place contains 28,722, and the canton 12,894 inhabitants, on a territory of 100 kilometres, in 17 communes.

GOSPIUM. See GOSPIUM.

GOSPLAR, in Geography, a town of the kingdom of Oehom, on the Gohe, which runs near this place into the Okear. It was a free and imperial town, having on one side the lake of Hildesheim, and on the other the principality of Wolframburg. It was founded in the year 922, by Henry the Fowler, and part of it re-built after being destroyed by fire in 1728. It has four parish churches, two chappels, and two Lutheran convents. Its principal trade arises from the mines of iron and lead in the Okear mountain near it; 30 miles S. of Brunswick. N. lat. 51° 55'. E. long. 10° 26'.

GOSSUM, a swelling of the thyroid gland. See Broscholle.

GOSSEWSTEIN, or GOSMANSTEIN, in Geography, a town of the bisphoric of Bamberg, on the Puthach; 20 miles E. S. E. of Bamberg. N. lat. 49° 45'. E. long. 11° 19'.

GOS-SPYUM, in Botany, the Cotton plant. The name is by supposition by the learned to be of Egyptian origin, and if so, is akin to Cotonus, or Cryptocotis, the evident source of our word Cotton, which is given as the Egyptian appellation of the plant in Alpinus, de Plaetis


Gen. Ch. Cal. Perianth double: the outer of one leaf, three-leaf, flat, largest; inner of one leaf, cup-shaped, with five blunt notches. Cor. Petals five, inwardly heart-shaped, flat, spreading, attached to the tube of the flaminas by their base. Stan. Filaments numerous, connected in their lower part into a tube, separate and lax above, inserted into the corolla; anthers kidney-shaped. Pist. German superior, roundish; style columnar, as long as the flaminas; stigma three or four, oblong, thickish. Peric. Capsule roundish, pointed, with three or four cells and as many valves, with contrary partitions. Seeds numerous, oval, fringed and enveloped in wool.

Eff. Ch. Calyx double; the outer three-leaf. Capsule with three or four cells. Seeds enveloped in wool.

The species of Cotton, like those of all plants cultivated from the most remote antiquity, in all countries, for chemical purposes, are extremely difficult to define, and obscured by numerous varieties.

Linnaeus in Sp. Pl. ed. 1, defines three species only,

1. G. herbeocam. Camer. Epist. 203. Cavan. t. 164. f. 2, supposed to be a native of the Levant, East Indies, and Africa, and generally cultivated in those countries for its produce.—Leaves five-lobed, pointed, with one gland beneath. Stem herbaceous, nearly smooth.—This is annual, with a bulky, branched, often zig-zag stem, smooth or only slightly downy. Leaves cut half-way down into three principal, and two smaller lateral, pointed rounded lobes. The mid-rib bears one gland at its back, about half an inch from the flank. Flowers yellow, purple at the base. Capsule the size of a walnut, enveloped in the calyx like a sifter.

2. G. herbaceus, taken up from Plukenet, t. 158. f. 1. Leaves three-lobed, entire, with three glands beneath.—Supposed to be a native of Barbadoes. It is at least one of those cultivated in the West Indies. The plant is in all its parts larger than the foregoing; lobes of the leaves not near to the mid-rib.

3. G. arborcum. Cavan. t. 165. Plub. t. 158. f. 3. (Cuda-pariti; Rhode Hort. Mal. v. 1. 55. t. 31.)—Leaves palmate, five-lobed; lobes lanceolate. Stem shrubby.—Native of the East Indies in a sandy soil. The woody perennial stem, and deep-cut long-lobed leaves, whose mid-rib bears one gland, distinguish this. The flowers are reddish. The cotton is used in manufactures. Willdenow erroneously quotes Alpinus here.

His Cotunisgar is in the Plant. Egypt. t. 71, not his Exot. t. 38, and does not agree with the East Indian plant.

To these is added in Sp. Pl. ed. 2. 975;

4. G. hierfum. Cavan. t. 167. Leaves with three or five acute lobes. Stem branched, hairy.—The synonym of Tournefort is wrong. This is said to come from America. It appears to us a hasty variety of the frill, for the gland on the mid-rib, which Linnaeus thought an exclusive mark of hierfum, is found in both.

What Linnaeus intended by G. religiosum, Syl. Nat. ed. 12. v. 2. 462, is rather doubtful. He defines it—Leaves thrice-lobed, acute, with one gland beneath. Branches dotted with black."—We have an East Indian plant which answers to this definition, but it does not exactly agree.
agree with what he has marked "religion" in his own herbarium, which appears to us barbarous; though it may be what he had in his garden.

With the "religion" of Murray, Comm. Gota, for 1756, t. 1, we are unacquainted.—Cavallini figures and describes several more species, especially G. "religion" t. 166, a noble plant, from Commerson's herbarium, gathered in the Mauritius.—Widénan, adopting these, reckons ten species in all, but the synonymy of the whole genus requires revision.

GOSTAST, Jotifsrud, or Jofopcheid, in Geography, a town of Saxony, in the circle of Erzgebirg; 23 miles S. of Chemnitz. N. lat. 50° 26'. E. long. 13° 2'.

GOSLIN, a town of the duchy of Wurzawl; 43 miles N.N.W. of Rava.

GOSTULLA, a town of Bengal; 22 miles E. of Kithaenge.

GOTARA, a town of Hindoostan, in Dahr; 57 miles S.S.W. of Patna.

GOTTEROT, a valley of Switzerland, in the canton of Friburgh, on the N.W. of the town of Friburgh, near the bridge leading to Bern, takes its name from the Goterom, a small rivulet; it is extremely narrow, and above two miles in length, and is bounded on each side by overhanging rocks of sandstone. Vernet, the celebrated landscape painter, flumed these rocks with great attention, and frequently declared that, excepting those of Tivoli, he never saw any where varying tints had a more pleasing and harmonious effect. The valley contains several mills, an iron foundery, where the ore brought from Franch Comte is forged, and a manufacture of linen and cotton, established by some merchants of Neuchatel, under the protection and encouragement of government.

GOTH, STEPHEN, in Biography, archbishop of Upsal, in Sweden, in the 16th century, concurred in the measures adopted by king John, to restore and re-establish popery in that kingdom. With this view he functioned a new liturgy, which, under the presence of bringing the Lutheran church nearer to the simplicity of the earlier ages of the gospel, artfully affronted the doctrines and ceremonies of worship to those of Rome, with the omission of some particular forms and expressions which would have too plainly divided the object in view. This liturgy was ordered to be used in all the churches. The king's brother Charles, and the clergy within his jurisdiction, were alarmed at this attempt, and they so effectually roused the jealousy and excited the fears of the people, and of the states, that after repeated efforts to carry his point, which introduced great confusion into the kingdom, and had nearly produced a civil war, the king was obliged to relinquish his scheme, and the liturgy was suppressed. It has long since become an object of curiosity among collectors, and is entitled "Liturgia Suecana Ecclesiae cum praefatione et notis Laurentii Upfalensis Episcopi," 1576. Univer. Hitt.

GOTHA, in Geography, a principality of Germany, in the circle of Upper Saxony, bounded on the N. by the electorate of Saxony, on the E. by the duchy of Weimar, on the S. by the county of Heussberg, and on the W. by the principality of Elersbach. The duchy contains 12 towns, and more than 200 churches; it abounds in grain and fruit, and the southern division contains part of the forest of Thuringia, and some mine works. The flate consists of three classes, viz. counts, nobility, and some barons, convoked by the prince. The reigning duke maintains a guard of 150 men, two regiments, each of which is composed of 800 men, and a corps of artillery. The chief rivers are the Leine and the Neisse.

The capital of the principality of the same name is seated on an eminence near the Leine, which supplies the town with water, conveyed by stone-canal, and is among the noble and handomest towns in Thuringia. It has an hospital for the fathers, two schools for their children, and barracks, in which the military art is taught; it has likewise a foundry for cannon, balls, &c. and two churches, a good academy, a house of correction, an hospital for widows, and another for orphans. The inhabitants carry on a considerable trade in wool and woollen manufactures, and beer; and they derive benefit, not only from the agriculture of the vicinity, but from the passengers that traverse it from Leipsick to Upper Germany. The residence of the duke, called Friedenstein, stands on a hill above the town, and contains an armoury, a valuable library, a museum of natural curiosities, and an excellent cabinet of medals: 13 miles S.W. of Erfurt. N. lat. 50° 37'. E. long. 10° 40'.

GOTH, a river of Sweden, which rises from the southern extremity of the lake Wenner, near Wennerborg, and after a course of 70 miles, falls into the sea near Gothenburg. In most places this river flows with a gentle current and in a narrow channel, and is navigable only in some parts of its course for small craft of 20 tons burden. If it could be rendered navigable through its whole course, the Wenner lake might be joined with the German ocean; but as numerous shoals and cataracts intervene, the communication has been attempted by the Carlgraf canal, the canal of Tralhassa, and the sluices of Akerflasa and Edes. About 10 miles from Gothenburg the river Gota divides into three branches: two unite again after encircling a small rocky island, crowned with the fort of Bolus, formerly deemed impregnable; the stream formed by the union of the two branches is called the Northern river, and falls into the sea after a course of 10 miles. The third branch retains the original name of Gota; and the space included between the Northern river and the Gota is named the island of Hillingen.

GÖTHARD, Sr., a town of Hungary, near which the Turks were defeated by the Chirilians, in the year 1663; 21 miles W. of St. Crois.

GÖTHARD, St., a chain of mountains of Swisserland, in the canton of Uri, the summit of which rises above the sea 9075 feet, though some have estimated its height to much greater. The particular parts of this chain are called by different names; of which the principal are the Salla, Prun, and Surecha, to the east; the Feudo, the Patuma, and the Locendo, to the west; to the north, the Urfino; and to the south, the ridge of naked and pitted rocks of the Val-Magdia. Of these, the Feudo is the highest. There are five parishes on the neighbouring heights, on which are fed 200 cows, 150 goats, and 30 hordes. The river Téno has three principal forces in the chain of St. Gothard; the first is a spring near the foot of the Prun, the second is the lake of La Salla, in another part of the eastern chain, and the third is furnished by the streams of mount Feudo. Three torrents uniting with another branch, that flows from the Furca, through the valley of Bedneto, form one great torrent, which takes its course towards the south, enters the lake of Locerno, and traversing part of the Mensano, falls into the Po. The course of the Reuse is the lake of Locendo, an oblong piece of water, about three miles in circumference, stretching between the mountains of Patuma and Locendo, and almost entirely supplied by the immense glaciers which crown the summit of the Locendo. The stream issuing from this lake rushes down the valley of St. Gothard, and joining in the vale of Urfeno, the two branches which come from the Furca on one side, and from the Grison mountains on the other, flow towards the north into the lake of Luc,
The valley of St. Gothard is exceedingly dreary. It does not contain a single field, nor produce a single tree; and the sides of the mountains are barely sprinkled with short herbage.

Mount St. Gothard affords one of the best Alpine passages from Germany and Switzerland to Italy. The Romans were acquainted only with that over the Great Bernhard and September. The Gothard was called by them sometimes Adula, sometimes the High and Lepentine Alps. The present road over this mountain begins at the village Hospitall, in the Urner valley, and terminates on the same side, at Airolo; its breadth is from ten to twelve feet, and it is covered with large pieces of granite.

The first attempt of passing over the Gothard in a traveling carriage, was successfully made in the month of July, 1775; by the late Mr. Greville, the gentleman to whose early exertion in collecting and in employing persons well qualified to assist him, we owe very great variety in their mixtures of minerals lately purchased by government for the British museum.

Though, in the high Gothard valley, the temperature is seldom below 19° of Reaumur, yet, on the N. side of the mountain, the climate is sufficiently rough to make the growth of trees cease at the height of 4,566 feet. Among a vast number of plants common to the Alps in general, we find here, as peculiar to mount Gothard, the Viola minima, and Campanula patula.

But most interesting is this mountain in regard to its mineral substances, and its geognostic structure in general: for, respecting the former, it may be said, that there is scarcely any where a tract of country known, that, within the same extent of space, affords so considerable a variety of them. This is not the place for enumerating all these fossils; we should, however, not omit mentioning, that the tremolite, which has received its name from the valley of Tremola, is, according to Ebel, not found there, but deeper down the mountain, in the Leventine valley. See Tremolite.

The St. Gothard consists entirely of primitive rocks, which, however, display, to the best advantage, their general and district characters. On the N. side veined granite, gneiss, mica-slate; in the plain of the rocky valley, where the Hospitall flanks, granite of large grain, traversed by veins of veined granite and mica-slate; from the summit downwards, on the S. side, mafic granite of large and small grain alternately, veined granite, mica-slate; in the Tremola valley, on the Flunio and Sorecina, hornblende-slate concretions, mingled with some patches of dike granular quartz, in others with feldspar, and lower down with fine reddish-brown, dolcicatal calcrete; with a surrounding rock the road winds, through the Piosella forest, down to Airolo. On the N. side, in the Urner valley, among the few mentioned rocks, runs pot stone on the S.S.E. part of the valley, and on the N. W.N.W. primitive horn-bone and clay-slate; while the S. side in the Leventine, Canaria, and Piora valleys, exhibits primitive horn-bone and gypseous.

All rocks of the Gothard are disposed in strata, having a direction from F.N.E. to W.S.W., and from N.E. to S.W., which is best observed between Hospitall and Airolo, where the road makes a transversal section, almost through the whole of the central chain. The regularity of the stratification of the granite is most striking in the neighbourhood of the Rudent bridge; the strata are from three to four inches thick, and have their direction from N.E. to S.W. Likewise, on the Piusa and Flunio, and southward from Hospitall down the valley of Tremola, the primitive horn-bone and gypseous, paws on the S. side of the mountain through the Leventine, Canaria, and Piora valleys, and the horn-bone, clay-slate, and pot-slate, lean on its N. side, in the Urner valley, are the continuations of the same formations that range through the whole of the Pays de Vand.

The ridges of mountains constituting the Gothard are exceedingly broken, and near the marks of causes the most destructive; nor is it improbable that they were infinitely higher in ancient times, and that, at the period of the Romans, they were not unaptly called the High Alps. The upper rocky valley, where the Hospitall is situated, is covered with numberless pieces of rocks, which are all precipitated from the surrounding peaks. The great proportion of a small grained granite, among the rocks of the Gothard, are the probable causes of this extraordinary devastation. The upper, nearly circular, rocky valley, was in former times completely flat on all sides; the remains of the rocks that formerly filled the chasms are still distinctly seen on the N. side, near the bridge over the Rudent, where the Reins forms a beautiful fall; and on the S. side, below the Hospitall, the rocks approach each other so closely, that the violent action which, and grained to the Caumizlii, is sufficiently evident. Before that revolution happened, it is highly probable that this considerable valley formed a deep lake; nor is it left for, that the Urner-valley, before the Devil's mountain was broken through, and the upper Leventine valley, before the Platier, near Dacezo Grande, was rent asunder, represented deep seas of considerable extent.

GOTHEBORG, a town of Sweden, in West Gothland, distinguished by a commodious port, and standing near the site of Lodef, a town built by Gustauus Vasa, which, being endowed with singular privileges, soon became the great emporium for the trade of the western provinces. Charles IX., when duke of Gothland, having, in 1604, laid the foundations of a new town in the island of Visingen, not far from Lodz, called it Gotheborg, in honour of his duchy. On his accession to the throne, he erected in his new town a trading company; drew thither many foreigners, particularly the Dutch, to whom he allowed an exemption from all duties of export and import during twenty years; established a corps of English and Scots troops, and granted to the Caumizlii a free exercice of their religion, the first place in Sweden where this toleration was permitted. By these means Gotheborg soon became a flourishing port, and, next to Stockholm, the most commercial town in Sweden. In 1611 it was reduced to ashes by the Danes, and afterwards rebuilt in the reign of Gustavus Adolphus on the present site, and obtained a confirmation of its ancient rights, with a grant of several new privileges. Gotheborg is built in a singular situation. At a small distance from the sea is a marshy plain, not more than half a mile in breadth, watered by the rivers Göta and Moldal, and almost included with high ridges of bare and rugged rocks. Gottheborg stands partly on the ridge, and partly in the plain, and is divided into the upper and lower town. The latter is entirely level, intersected by several canals, and the houses are constructed on piles: the upper part hangs on the ditches, and rows of buildings rise one above the other like the tents of an amphitheatre. The whole is regularly fortified; and the circumference is near three miles, exclusive of the suburbs, called "Haga," which lies towards the harbour. The streets are uniformly straight; some few of the houses are of brick, but most of them are constructed of wood, painted red. The harbour, formed by two chains of rocks, is about a quarter of a mile in breadth; and the entrance is defended by the fortress of New Efelfborg, which stands on a small rocky island, and contains a garrison of 250 men.

A royal society of sciences and literature has been lately established.
established in this town, on the plan of that of Upsal. The acts, written in the Swedish tongue, and printed in 8vo., contain dissertations on various subjects, in the several branches of science, natural history, antiquities, history, and similar letters. The population amounts to 150,000 persons, in consequence of an increase, occasioned by the extension of its commerce, particularly on account of the East India company, and the success of the herring fishery. The East India company was established in 1731, and, on account of the ice, which closes the port of Stockholm, in the gulf of Bothnia, at the proper season of the departure of ships for the East Indies, the company carries on its commerce from Gothenburg, whose harbour, lying in the German ocean, is more open. In 1749, the herrings, which had not hitherto usually approached the western shore of Sweden, flocking in shoals, the inhabitants of Gothenburg established a fishery, which has been very lucrative. The fishery begins in November, and though it continues fearfully three weeks, it supplies the fishermen of Gothenburg with not less than 600,000 barrels. Of these, 250,000 are salted, and the oil is drawn from them; fifteen barrels of herring yield one of oil, which is principally exported to Holland and Spain. One barrel of salt, procured from Spain, covers three barrels of herrings: the average exportation of salted herrings may be estimated, and the inland consumption of Sweden at 50,000 barrels. An English consul and factory reside at Gothenburg; and a chapel, with a regular chaplain, is appropriated for their use. The fortifications of Gothenburg are so weak, that in the year 1788 it must have fallen into the hands of the Danes, if foreign powers had not interfered. N. lat. 57° 40'. E. long. 11° 44'. Coox's Travels in Sweden.

GOTHIC, or GOTTICK, something that has a relation to the Goths, an ancient people, originally inhabiting that part of Sweden called Gothland; whence they spread themselves over Greece, Dalmatia, Bulgaria, Italy, Spain, &c. See Gothics.

Gothic Architecture, a term of approbation to denote one or more kinds of architecture which prevailed during the middle ages. It seems to have been invented by the reformers of the Grecian orders in Italy, about the middle of the 16th century, to dignify every preceding species of European architecture not conformable to them, and it was imported into England by Christopher Wren, though the latter appears sometimes to confine the term to the pointed style, in which particular he is followed by the greater part of late writers. Mr. Evelyn, quoted by Sir Christopher Wren, in his "Parentalia," says: "Gothic architecture is a conglomeration of heavy, dark, melancholy, monkish piles." In the same sense, Sir Christopher himself, speaking generally of what he terms Gothic architecture, calls it "Mountains of stone; vast, gigantic buildings, but not worthy the name of architecture. This we now call the Gothic manner: so the Italians called what was not after the Roman style." In opposition to the idea which this eminent architect gives of the architecture in question, he, in another part of his Parentalia, describes the inventors of it as "setting up slender and misshapen pillars, or rather bundles of slates and other incongruous props, to support ponderous arched roofs without entailure." In conformity with this latter notion of Sir Christopher, Mr. Rous, a professional writer, says: "Modern Gothic is distinguished by the lightness of its work, the exquisite boldness of its elevations and of its sections, by the delicacy, profusion, and extravagant fancy of its ornaments." The fame confusion of language, if not of ideas, prevails amongst the admirers of the Gothic style, so called, as amongst the declared foes of it. The late poet laureat, Thomas Warton, who has written a great deal on the subject, and who had planned a "History of Gothic Architecture," speaking of Salisbury cathedral, expressly denies that it is in the Gothic style, while two other celebrated writers in the same line, the Rev. James Benthall and Capt. Groats, as positively affirm that this cathedral is "entirely in the Gothic style." The perplexity and uncertainty of an ordinary reader must necessarily be increased by the different senses in which the terms, ancient architecture, modern architecture, Saxo-Celtic architecture, Norman architecture, and English architecture, are now used by different writers. To clear up this confusion, and to present distinct and clear ideas on these much agitated subjects, it seems best, to treat them in an historical manner.

It is demonstrable that the regular orders of Grecian architecture were upon the decline throughout the Roman empire after the reign of the Caesars, and fall more so after that of Constatine the Great. A century later the Ostrogoths overran and subdued Italy, the Visigoths, Spain, the Huns, Germany, the Vandals, the Roman provinces of Africa, the Franks, France, and the Saxons, Britain. These fierce barbarians destroyed innumerable monuments of all architecture, and the other arts, but they did not introduce a style of building different from that which they found professed in the conquered countries. They did not infect the ancient inhabitants to build in a new manner; on the contrary, they learnt of them so much of the art as they actually acquired. But the art itself being vastly degraded in the fifth and sixth centuries, and those warlike hordes not being very apt scholars, no wonder their first structures were executed in a rude and heavy style. Still nothing is more groundless than to speak of Gothic architecture in the manner of Mr. Evelyn and Sir Christopher Wren, as of a style of building invented or introduced by the Goths. The fact is, the heavy circular manner of building which prevailed throughout Christendom, from the fall of the Roman empire, in the fifth century, down to the twelfth century, was the Roman, or, what is the same thing, the Grecian style, incorrectly and rudely executed. Amongst us it is called the Saxon style, because it prevailed during what is called the Saxon period or dynasty in South Britain; but the first teachers and the models of it were both of them of the time of Gregory the Great. On the first introduction of Christianity amongst the Saxons, at the conclusion of the fifth century, they consecrated many of the existing Pagan temples to the Christian worship, according to the instructions which they received to this effect from pope Gregory the Great, and they ran up other temporary oratories of wood or wattles, as we learn from Bede, and other original historians. Very soon, however, the Saxon millionaires, who converted them, taught them to build churches of stone after the Roman manner; for this denomination of it, the Roman manner, (more Romans,) is always mentioned by the aforesaid historians. The first archbishop of the Northumbrians, Paulinus, who was a Roman monk, appears to have been the chief architect amongst the English Saxons at the beginning of the seventh century. He built churches of stone at York, Lincoln, and other places. His next successor but one, Willfrid, was an Englishman, who not only equalled but greatly surpassed his master in architecture. For the churches which he built at Rippon and at Hexham were long celebrated for being the finest buildings of their kind north of the Alps; but this is expressly recorded, both of him, and his rival in architecture, Benedict Biscop, abbot and founder of the church and monastery of Were-
mound, that they made different journeys to Rome, and studied the architecture of the church of St. Peter's and other churches there, and that they even hired workmen from thence to execute their works in England. Thus it evidently appears, that the style of architecture, which is called the Saxon style, was not the invention of our ancestors, but was imported from Italy in the seventh century; and it is equally evident, from various monuments, that the Italians in the and the subsequent ages built in the same heavy manner, and made use of the same members and ornaments, that the English Saxons did. Still the architecture of our ancestors, previously to the conquest, though very heavy and rude, has been too much depreciated by many English writers. The Rev. Mr. Bonham, in his "History of the Church of England," or rather the post-Grey, who drew up its architectural part of that work, refrains from, Staveley, and other authors, who deny that the Saxon builders made use of stone for their buildings, or knew how to turn an arch; but then this very writer fails to do them the justice due to them, where he signifies that they were unacquainted with the use of towers, bells, and transepts, previously to the tenth century. It would have been strange if they had not imported these amongst other ecclesiastical inventions from Italy during the preceding centuries; but we have otherwise sufficient proofs that they had adopted each of them long before the tenth century.

During a great part of the ninth and tenth centuries, England and France were as much harassed by invasions of the Northern barbarians, as their former inhabitants, the Gauls and Britons, had been in the fifth century, by the ancestors of the now civilized Saxons and French. These turbulent invaders, who were indifferently called Danes or Normans, were guilty of much greater devastation upon the existing religious monuments, at least, than the Goths and Vandals had committed; because the latter were Christians, though Arians, when they over-ran the civilized world; whereas the Danes and Normans, when they invaded England and France, were persecuting Pagans. So great was the dread of their violence throughout the half mentioned country, that the following petition was there added to the litany: "From the fury of the Normans, O Lord deliver us." In fact, the Almighty was pleased to deliver first France and then England, from the scourge which had so long and so forcibly afflicted them; but in a very different manner from what the Christian inhabitants expected. Instead of witnessing the extermination or subjugation of their barbarous enemies, they saw them bend their necks to the yoke of Christ, and become models of piety and morality to themselves and the other Christian nations. Such a feat was the cause of the Northern men, who settled in that part of France, which from them has since been called Normandy. A falling peace and tranquillity being, through this happy event, restored to the French provinces, its princes and nobles began to rebuild their demolished churches, and to erect others with incredible diligence. But no people flowed so much zeal in this undertaking as the newly converted Normans. The reader will be convinced of this, when he is given to understand that William the Conqueror, during the few years that he reigned in Normandy, I previouly to his invasion of England, built two noble churches and abbeys, and his nobles, not fewer than thirty-eight, each of them availing with the rest, to make his building the most magnificent and splendid. Such were the Normans, the bravest, most industrious, and most religious people, and the most addicted, in particular, to ecclesiastical architecture of all Christian people, when William, his prince, with the flower of his nobles, his army, and his ecclesiastics, came to settle in England soon after the middle of the eleventh century. It is to be observed, that the most celebrated schools of

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Literature and the arts, and more particularly of architecture in Europe, at this period, were the abbeys of Bec and Caen in Normandy, the former of which produced those three great architects, Lanfranc and Anselm, successively archbishops of Canterbury, and Gaundolph, bishop of Rochester. But indeed all the Norman prelates and abbots appear to have been able architects; for there was hardly a cathedral or abbey church in England which was not rebuilt by one or other of them, in the course of thirty or forty years after the conquest. The characters which they aimed at in their structures were evidently the sublime and beautiful. To produce the former effect, they built their churches as long and as lofty as possible; to produce the latter effect, they not only built in a much more neat and perfect manner than the Saxons had done, but also they made use of certain new invented ornaments in their structures. Of these the most offensively and ordinary was the arcade or series of arches which, in one or other of its various forms, is to be met with in all the existing Norman churches. From the continued efforts of these indefatigable and ingenious architects, to make their churches as awful and as beautiful as possible before the middle of the twelfth century, a new style of building was produced, called "the Pointed Style." It certainly appeared, for the first time, either in England or in France; nevertheless, the fact ascertained influence of which has hitherto been produced, claims the honour of the invention for this country. But before we proceed to give a more particular account of the rise and progress of this singular style of building, it will be proper to detail the various other systems which have been published respecting it.

It has been seen above, that Mr. Evelyn and Mr. Christopher Wren describe the architecture of the middle ages, in general, whether circular or pointed, under the opprobrious term of Gothic, as being the real invention of the Goths and other barbarians. The former of these writers, as quoted with approbation by the latter, says, in his "Parentalia": "The Goths and Vandals having demolished the Greek and Roman architecture, introduced, in its stead, a certain fantastical and inventions manner of building, which we have since called modern Gothic, of the greatest industry and expensive carving, full of fret and lamentable impiety, sparing neither pains nor cost." We see that the writer here speaks of the light pointed ornamental style of our ancestors no less clearly than he does in another passage, quoted above, of the plain heavy circular style, called the Saxon; and that he supposes the former no less than the latter to have been really introduced into the countries, which had formed the Roman empire, by the Goths and Vandals, who subdued them. How little reason there is for ascribing the Saxon style to these barbarians has been shown above; and, with respect to the pointed style, it is sufficient to observe that this appeared in no part of Christendom before the twelfth century; whereas the Goths and Vandals committed whatever depredations on the monuments of Roman art, which they did commit, in the fifth century, and that their power was everywhere crushed, and their very name extinguished in the course of the sixth century, except, indeed, in Spain, where the name of Gothic remained attached to the reigning family, till the beginning of the eighth century and no longer. So groundless and absurd, in every respect, is the term Gothic, as applied to pointed architecture!

At the same time that Mr. Christopher commends the system of his friend Mr. Evelyn, he himself departs from it, since he prefers the word Spiracentic to denote the pointed style. "What we now vulgarly call the Gothic," he says, "ought properly and truly to be named Saracentic architecture, refined by the Christians, which first of all began in the East, after the
the fall of the Greek empire. The holy war gave the Christians who had been there an idea of the Saracen works, which were afterwards imitated by them in the West."

This system concerning the pointed style, namely, that it originated with the Saracens, has, out of mere respect to the name of its author, Sir Christopher Wren, been followed by bishop Lowth, in his life of Wyclam, by Kious, by Marton, by Grose, and, in short, by the generality of modern writers who have had occasion to enter upon the subject. In refutation, however, of this system, we have to remark that the first, or Grand Crusade, in which the conqueror's son, Robert, and many other Normans and Englishmen embarked, making part of above a million of persons, who were engaged in it, began in 1096, and terminated by the capture of Jerusalem in 1099. Now it is certain from history that the cathedrals of Exeter, Rocheller, and Chicheller, with many abbey churches, were built wholly in the circular style after the last-mentioned year. Amongst these the influence which is most to the present purpose is that of Rocheller cathedral, which was built by that greatest architect of his age, Gundulph, formerly a monk of Bec abbey, then bishop of Rocheller, as well as the castle of that city, the chapel in the white tower of London, &c. without the leaf mixture of the pointed style. The reason of this, because Gundulph had travelled through the East on a pilgrimage to Jerusalem, a little before the crusade took place, when he had an opportunity of surveying the churches and other buildings of those countries at his leisure. Again, it has been remarked by Grose, Beatham, and other writers on the subject, that in all the descriptions and drawings of buildings in the Holy Land and other parts of the East, given us by Pecock, Norden, Shaw, Le Bruyn, &c. there is but one church, namely, that of St. John d'Acro, in the proper pointed style (which church the writer of this article has discovered to have been built by William, an Englishman, at the time when our Richard I. made himself master of that city); and that very rarely such a thing as a pointed arch is represented as existing in those countries. It is true a late writer, the Rev. Mr. Whittington, in his "Survey of the Ecclesiastical Antiquities of France," has proposed to discover from these and other drawings pointed architecture in every part of the East, from the Euxine sea to Egypt; but then it appears that he calls the mis-shapen obelisks and minarets of the Mahomedan mosques pointed architecture. He has another argument for his position, namely, that "it is improbable the dark ages of the West should have given a model of architecture to the East." If there is any force in this argument, it would follow that the mathematical scale of belfies, optical glasses, the mariner's compass, gun-powder, and print were discovered in the East instead of the West, contrary to the known facts.

Mr. Murphy, to whom the admirers of pointed architecture are indebted for his elegant views of the church of Batalla in Portugal, conjectures that this style was borrowed from the pyramids, and that of course Egypt was its native soil. But is almost every country and age men have built their habitations with sloping roofs to carry off the falling rain; hence they must have been the figure of a triangle at the gable ends of them, no less than the Egyptians did in their pyramids. Denon's, Meyer's, and other views of ancient buildings in Egypt, are by no means favourable to Mr. Murphy's system. There is indeed an ancient hall in the castle of Cairo, called Joseph's Hall, which is a great deal in the pointed manner, and which is supported by the vigors to have been built by the patriarch of that name; but Niebuhr and lord Valentia give sufficient reason to believe that it was built by Saladin, the enemy of our Richard I., whose true name was Joseph. In fact, it is in the style of that period. According to this supposition, we are warranted in believing that this hall was the workmanship of Christian prisoners, or fugitives, after the third crusade. Mr. Murphy's theory is equally delusive of historical grounds and moral probability.

Bishop Warburton, in his "Notes on Pope's Epistles," endeavours to unite together two of the above-mentioned refined systems, that which derives pointed architecture from the Northern Goths, and that which brings it from the Eastern Saracens, at the same time that he assigns the western peninsula of Europe for the real place of its birth. The following is an abridgment of his account. "When the Goths had conquered Spain, and the religion of the old (Christian) inhabitants had inflamed their piety, they struck out a new species of architecture unknown to Greece and Rome. For this northern people having been accustomed, during the gloom of Paganism, to worship the Deity in groves, when their new religion required covered edifices, they ingeniously projected to make them resemble groves; at once indulging their old prejudices, and providing for their present conveniences by a cool receptacle in a sultry climate, with the assistance of Saracen architects, whose exotic style of building suited their purpose." All this is mere reverie.

The Goths and Vandals entered Spain in the year 409. They did not, however, acquire there a new religion from the old inhabitants, for they were already Christians, and habituated to the use of churches. On the other hand, the Moorish Saracens did not enter Spain till three hundred years afterwards, namely, till the year 712, when having crossed up the Christians in the mountains of Afturias, there continued ever afterwards the most relentless warfare between the two people. It is impossible to conceive more monstrous ideas than that the Christian Goths should have brought with them into Spain a partiality for the Pagan worship which they had practised in the forests of Germany, and that they should have retained it for the space of three hundred years afterwards, till they had the means of employing their implacable enemies, the Mahomedan Moors, to build Christian churches for their use; and that when this was effected, they should have kept the secret of pointed architecture to themselves for the space of 400 years longer! Were all this possible, or were it a fact that this style had been imported into our country from any other, where it had been practised for a considerable time before, it would have made its appearance amongst us at once, with its several striking characters; contrary to what we actually find was the fact. After all, if the aisle of an ancient cathedral resembles an avenue of trees in some respects, it differs from it in many others, which are obvious to the sight.

Having followed different guides, north, east, and west, in search of the original pointed architecture, we have latterly been invited by an ingenious artist to accompany him to the south, namely, into Italy, the cradle of modern arts, with a promise that he will there point out to us much earlier specimens of this style than are to be met with in this northern climate. In the year 1805 Mr. Simirczian, jun., returned from Italy, laid before the Society of Antiquaries a certain drawing, since engraved in the "Archaeologia," vol. xvi., of the dressings of a window belonging to the cathedral of Modena, in the richest style of the third pointed order, being such as we have no example of in this country before the middle of the 15th century. These dressings he would have us believe are coeval with the cathedral itself, which was built by the Norman chiefstain Roger, earl of Sic-
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ly, in the eleventh century. He presented another drawing, published by the society as aforesaid, which appeared to be much more for his purpose, because of the known dates of the original. This drawing represents a portion of the outside of the baptistery of the cathedral church at Pisa, which baptistery was certainly built by Diotisalvi in 1152. The drawing exhibits what we should call Roman and Saxon work, with intermixed crocketed pediments and pinnacles, such as we were unacquainted with for more than a hundred years afterwards. Lastly, this gentleman viewed a view of the cloister of Campo Santo, adjoining the altar mentioned cathedral, built in 1278. Here we see the richest tracery multitudes under semi-circular arches, the whole of which he considered as being the same original work. These specimens gained many converts to his system, that of Italy being the parent country of pointed architecture.

But there is no error which we have to guard against in studying architectural antiquity as the confounding of false-quaint alterations with the original work. There are few adepts in this science who would not flate at the first sight of Mr. Smirke's drawings, and who would not pronounce the works they represent an incoherent mixture of the architecture of different ages; but it was reserved for Sir Henry Englefield's profound knowledge of the subject and critical acumen to detect and exhibit in detail the pointed enrichments with which later architects had decorated the plain circular works of their predecessors. To the justice of this learned antiquary's remarks the accurate history of the cathedral of Pisa, written by Martini a canon of that church, bears ample testimony. In a word, all the specimens which Mr. Smirke has produced in favour of Italy's claim to the invention of pointed architecture, as well as all the other buildings, tombs, and altars at Rome, and in every other part of Italy, demonstrate its great inferiority both in date and in execution, to England, France, and Germany, with respect to this particular style.

Allied, in one respect to the system of Bishop Warburton, is that of Sir James Hall, bart., who, in "An Essay on Gothic Architecture," now published, endeavors to show that the pointed style was borrowed from the idea of upright pinnacles surrounded with ornamental work, the heads of which are to meet like those of trees in an avenue. But the utmost that the ingenious baronet proves is that basket-work may be made to resemble pointed architecture, not that pointed architecture was borrowed from existing models of basket-work. Lord Orford, heretofore Sir Horace Walpole, in his "Observations on English Architecture," says, that the architecture in question was copied from frame-work; just as if the making of boxes preceded the building of houses! After all, this is only placing the tortoise under the elephant; for where did artists learn to fashion their frises in the pointed style? Lastly, Mr. Payne Knight derives this style from all the three parts of the world, heretofore known, Europe, Asia and Africa, where he decides, in his "Principles of Taste," that "the style of architecture which we call cathedral or monastic, is manifestly a corruption of the sacred architecture of the Greeks or Romans, by a mixture of the Moorish or Saracenic, which is formed out of a combination of the Egyptian, Persian, and Hindoo."

But why should we wander into every remote corner of the world, and even into the regions of fancy in search of an invention which belongs to our own climate? And for what purpose should we take so much pains to prove a plant to be an imported exotic which we have seen sprouting up, and attaining its full growth in our own garden? Let us now go back to the point from which we started in pursuit of various false sysleds. We have seen above that the greatest people, without dispute, of the eleventh and twelfth centuries, namely, the Normans, the conquerors of England, France, Italy, Sicily, and various regions in the East, were at the same time a most industrious and ingenious people, and puffed of the most ardent passion for ecclesiastical architecture of any people we read of, and that they were guided by each other in the grandeur and beauty of their respective structures. To produce the effect of grandeur, as it has been before observed, they gave the greatest possible length and height to their churches; for that of beauty they devised several architectural ornaments; the most common of which was the arcade or series of small round arches, which appear on some part or other of all their churches built in this country subsequent to their conquest of it, and which sometimes cover the whole of them over, as we see on the outside of St. Botolph's priory, and St. Olyth's abbey in Essex, and in the balustrade story of the inside of Durham cathedral. Thefe arcades the architects diversified in a great variety of ways, as may be seen upon the tower of St. Augustine's monastery in Canterbury, built by the Norman abbot Scotandius in 1080. One of the varieties consisted in making the circular arches intersect each other. The portion thus intersected formed a new kind of arch, more graceful in its appearance, and far better calculated to give an idea of height than the round one, which, however, had hitherto been adopted by all nations, whether Egyptians, Greeks, Romans, or Saxons. In fact, every one must be sensible that a pyramid or obelisk, from its aspiring form, appears to be taller than a semi-circular arch, the diameter of which is equal in height to it. Thence plain and intersecting arcades were sometimes irregularly intermixed, as in Carlepio's and Flambard's work on the north side of Durham cathedral; and sometimes placed in alternate rows, as in that of Remigius on the façade of his church at Lincoln. The pointed arch thus formed appeared first in mere bifo refces, as in the above mentioned inlances, amongst several others; but soon it was likewise seen in alto relievo over niches and recesses, in the walls of churches, as in the remains of archbishop Lanfranc's work in Canterbury cathedral, and in the abbeys of Gloucester and Ramsey. It is probable that some of the first, if not quite the first open arches in the pointed style now existing, are the twenty windows in the intersected portions of such crossing arches in the choir of St. Crois near Winchester, made by that great encourager of the arts, and particularly of architecture, bishop Henry de Blois, king Stephen's brother. The date of this work is 1132, according to Godwin, Grose, and others, or 1135, according to bishop Louth, who had examined the records of this foundation, and Rudborne, the monk of Winchester, in his "Historia Major Wintoniensis." Most probably the choir was begun in the former year, and finished in the latter. As the prelate proceeded in his work, from the choir to the transept and tower of his church, he made several other pointed arches without any intersecting circles over them, notwithstanding the greater part of his work, as still appears, was the circular Saxon. In 1138, as we are assured by the above-mentioned monk of Winchester, and another monk who wrote the "Annales Wintonienses," bishop De Blois rebuilt his episcopal mansion of Farnham in Surrey, where his successors still ordinarily reside. Now in the ancient part of this building, we see at the present day pointed arches resting upon circular Saxon columns, just as we do at St. Crois; and no architectural critic, with these documents before him, will hesi-
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rate a moment in pronouncing them part of the work in question, executed by De Blois in 1138. As the same prelate restored the abbatial church at Rumsey, where his niece Mary was a nun, and as he himself had been abbot of Chaltonbury, before he was bishop of Winchester, we may safely attribute the pointed arches, intermixed with the circular ones in these two structures, to his direction, some time in the latter end of the reign of his cousin Henry I.

After all, it would be rash to pronounce absolutely that bishop De Blois of Winchester was the author of pointed architecture, since we have convincing evidence, that churches were built by other architects about this period, in the same mixed style of pointed and circular work. We must, however, incidentally observe, that before the conclusion of this twelfth century, the circular style was entirely laid aside, as well with respect to columns as to arches. We have evidence, for example, in the annals both of St. Wulfran's abbey Chelles, and of Peterborough abbey, quoted by Dugdale, that Bishop was abbey in Shropshire, where the seven pointed arches of the nave, surmounted by small circular arches, in the upper story, are still seen, was founded either in 1136 or 1139; probably it was begun in the former year, and finished in the latter. We might argue in the same manner from the dates and actual state of Kirkthorpe abbey, Lantony abbey, and several other ancient structures. If we may give implicit credit to the testimony and the plates of Captain Groke, the Scotch architects were not long in adopting the style of their English neighbours. It is remarkable that the ecclesiastical buildings erected by David king of Scotland, and his nobles, before he came into England in order to command the armies of his niece, the empress Maud, were purely in the Saxon style; whereas those founded there, after that event, present the same mixture of circular and pointed architecture which prevailed at that period in England.

A late writer, the Rev. Mr. Whittington, whose professed object it was to transfer the credit of the discovery in question from the Norman English and English to the French, which credit the latter seem disposed, from traditionary accounts, to attribute to our countrymen, has asserted that examples of pointed arches, of a more ancient date than any existing in England, are to be met with at the abbey church of St. Denis near Paris, which church was finished in 1144. It appears, however, that this writer was unequipped with the historical evidence on which the above-mentioned early influences of the pointed arch in England rest, and that he was even at a loss to determine which of the works at St. Denis really belonged to the period he has assigned. If we examine the pointed windows of this abbey, exhibiting different transitions of the first cruciform in Montfaucon's "Monarchie Françoise," which windows are said by this great antiquary to have been executed by abbots Sager in 1140, we shall not find the appearance of a pointed arch in any of them. It may be added, that in the famous transept of Parma, representing the conquest of England, and said to have been wrought by the conqueror's mother, there is no appearance either of a pointed, or so much as of an intersected arch, in the several churches, shrines, and other architectural works there displayed. In a word, throughout the whole of Montfaucon's plates, we every where find the French pointed architecture much inferior to that of a corresponding date in our own country.

To return to the subject of intersecting arches: we observe these sometimes to consist of plain semicircles crossing each other, as on the outside of the south transept of Wal-ke lyn's work at Winchester, and on the north transept of Warwiclt's work at Exeter, forming in the interections simple pointed arches; and sometimes we remark that the interections roll upon pillars, each of them being surmount- ed with a capital, or at least with an abacus, as on the north transept of Durham, and the west front of Lincoln cathedrals. In the latter case, we have the appearance of pointed arches with lateral points, or cusps within the heads of them, as Sir James Hall has very aptly termed them. This addition to the pointed arch was occasionally used in the first period or order of pointed architecture, but afterwards it became universal. The addition of another cusp on each side of the pointed arch turned its trefoil head into a cinque foil. In like manner, four of these cusps being placed at equal distances within that circle or "L'Œil de Bœuf," within the Roman and Saxon architects had been in the habit of placing in the tympanum of their pediments, turned it into an elegant quatrefoil or cross. By means of additional cusps, and circles within circles, the Katharine wheel, or Marygold window, as it is called in England, or "La Rose du Portail," as the French call it, was easily produced. In all the works executed during the middle and latter part of the twelfth century, a confused heterogeneous mixture of styles is everywhere discernible, as might be expected where secular fashion began to be left off, and the pointed one to be used instead of it.

In a general way, the arches were altered before the columns. Hence nothing is so common as to find in the structures erected between 1140 and 1150, arches of the flump point, reeding on circular Saxon pillars of the greatest circumference. It could not, however, long escape the observation of our indefatigable architects, that such heavy supporters ill accorded with the lightness of the aspiring arch. Accordingly, towards the latter end of this twelfth century, in some instances the circular Saxon columns began to be shaped like the Arabic numerical figure 8, so as to retain its former strength, and to appear gracefully slender; and whereas columns were made use of more for decoration than for strength, as for example to support ornamental arcades, or the arches of windows or doors, very thin detached columns were employed, and these for the most part made of Parbeck or Purbeck marble. We have a striking and most interesting example of these and other improvements which took place in the pointed style, towards the latter part of the twelfth century, in the east end of Canterbury cathedral. Persons who cannot see the original, will find it accurately represented in Mr. Carter's treasury of original specimens, called "The Ancient Architecture of England." This portion of our Metropolitan church was rebuilt, after an accidental fire had destroyed the upper part, and weakened the remainder of it, between the years 1175 and 1180. As we have the incomparable advantage of possessing a circumstantial account of this building, and of the differences between it and the former structure, raised a hundred years before by Bishop Lanfranc, which account is drawn up by the intelligent monk Geofrey of Canterbury, who was an eyewitness of what he relates, we shall find some of the most material parts of it; he tells us how, that the pillars of the new choir were of the same form and thickness with those of the old choir, but that they were twelve feet longer; that the former capitals were plain, while the latter were delicately carved; that there were no marble columns in Lanfranc's work, but that there was an incredible number of them in the work of the two Williams; that the stones which formed the ancient arches were cut with an axe, but those of new arches with a chisel.
that the vaulting of the side aisles of the choir was plain; whilst that of the new choir was groined and fixed with key-flouens; that the former choir had a flat ceiling ornamental'ly pointed; but that the succeeding choir was elegantly vaulted with hard stone for its ribs, and light topi flouen for the interstices; finally, that there was only one triforium, or gallery, round the ancient choir, whilst there were two such in the modern choir. The east end of this venerable cathedral, as it is seen at the present day, and as it is represented by Mr. Carter, exactly corresponds in thee and in other particulars with this description of it, given 600 years ago. It is all in the first order of the pointed style, except the main pillars, which are (to the eye round); with a furt of Corinthian capital, and except the arches springing from these pillars, which are also circular as far as the colonn abscissa or altar end, these being point ed, as likewise with the exception of certain blockings and mouldings, where the Saxon billet ornament is still seen.

The improved architecture of this, the most dignified church in the island, could not fail of being adopted in our other churches, when there was occasion for rebuilding or repairing them. Lincoln cathedral seems to have led the way in this particular about the year 1195, under the di rection of its bishop St. Hugh, who was not less renowned for his skill in architecture than for the sanctity of his life. This prelate undertook to rebuild the whole of his vast cathedral, and he was fo intent upon the work, that, as Matthew Paris tells us, he carried mortar and stones on his own shoulders for the use of the masons. The building was so far advanced at the time of his death, which happened in the year 1200, that he is considered and called its founder, though his work was not finished till about fifty years afterwards, in the episcopacy of Robert Grofetice. Excepting the west front, which is almost all the work of the Norman prelate Remigius, and the towers, the groining, the screens, and certain other decorations added in the fourteenth century, the whole vast pile of St. Mary's church and Chapter house at Lincoln is in the siple style of the first or lanceal order of pointed architecture; but awful and beauteous beyond the conception of those who have not seen it, and greatly superior to any church of the fame order and period to be found in France. In 1202, the rich and powerful bishop Godfrey de Lucy, amongst his other great works, began to rebuild the eastern part of his cathedral at Winchell, where he executed in the style of the Metropolitan choir, but without the least mixture of the Saxon. His extensive work is still to be seen there, consisting of long narrow sharp-pointed windows and other arches, detached pillars of Purbeck marble, quatre-foil mouldings, and light groining of simple interlacing ribs. And, whereas, it became very uulaf, for the sake of gracefulheads and the like, where they were used as windows, to place two or more crook arches close together under another pointed arch; the greater width, in consequence of which a vacant space occurred between their heads; a trefoil, quatrefoil, or circular arch was frequently introduced, with the happiest effect, to fill up this space. In 1227, archbishop Walter de Cantilupe began to rebuild the northern Metropolitan church, and the prevailing style, and he actually finished the work during his lifetime as it is now seen. The same kind of work was carried on at this time at Worcester, Salisbury, and other abbey churches. The late-mentioned church, which had an entire new foundation, begun by bishop De Puteulis in 1225, and finished by bishop Bridport in 1258, exhibits in its front and other parts, the double lancet arch, the intermediate quatrefoil, and all the other cha tracters described above. There being occasion, however, to place three lancet arches together in the windows of the upper story, the head of the middle one was gracefully raised above the other two, an improvement which was soon adopted in many other churches. A full more striking im provement which took place, if not at Salisbury for the first time, at least about the time of its completion, was the elevation of the cornice, pediment, or canopy which had hitherto adhered, or at least had been near to the architrave of the arch. This was now raised, like the two sides of a triangle, to a considerable height above it. The jambs of the pediment were at first rather short, not reaching, by any means, to low as the springing of the arch, and generally rolling on some small flower or other flight ornament.

The point of the canopy always terminated in a trefoil or other graceful ornament, but was not, as yet, adorned with crockets or foliage down the jambs. Bishop De Pove, being translated to Durham, began to ornament the east end of his present cathedral in the style which he had introduced into the one he had left. Whilst the work at Salisbury was drawing towards a conclusion, that at Westminister abbey, was beginning, namely, in the year 1245. The north transept, and part of the adjoining nave of the church, remain in almost the same state they were left in by their founder Henry 111. The windows of the last-mentioned portion of the abbey, together with the corresponding aisle, are larger and better proportioned than any which had hitherto been seen in this island. Here also we meet with the cinquefoil rofe between the heads of the two lights; while the exterior windows of the triforium or gallery consist entirely of a triple cinquefoil under a pointed arch. These two models for the upper part of church windows were long followed. On the other hand, the arches and windows of the transept, being placed in a regular square and very narrow, presented an appearance of those large mullioned windows which, in the succeeding period of this style, came into fashion. In this part also of the abbey church, namely, the inside of the transept, we begin to meet with good flatuay.

During the reign of Henry's son, Edward I., which began in 1252, the architecture of this country, through the ingenuity and industry of its artists, acquired a new character, and may be said to have grown into a new order of the pointed style. The first and distinguishing feature of this was the general adoption of the well proportioned and well turned alstephing arch. The arches which had hitherto been constructed, though sometimes accidentally perfect, were, for the most part, too acute. But the arches built at the latter end of the thirteenth century generally approached to the perfect proportion. This proportion, according to the best judges, is when an equilateral triangle can be inscribed within the crown and imposts of the arch. The arches also were gracefully turned. Besides all this, they were now invariably ornamented in their heads with cusps, so as to form trefoils, cinquefoils, or sepofts. In like manner the pediments or canopies over the arches were universally purplied, that is to say, adorned with the representation of foliage called crockets, from the corbel on which they rested up to the rich flower or other elaborate finial in which they terminated. These corbels or brackets now corresponded in height with the springing of the arch, and mosty exhibited bulbs of the founders or other benefactors of the establishment. Pinnacles, which hitherto had been both very simple and very rare, were, in this improved order, placed at the sides of almost every arch, and on the top of almost every buttress, being invariably purplied and sur mounted with rich finials. A pinnacle of a proportionable
size being placed on a tower, instead of a buttress, became a broach or spire. Accordingly the use of spires became almost general in the fourteenth century. We even read of a new built tower being pulled down, because it was unequal to bear the weight of this grand ornament, when a new one was built, which, with its spire, was as high as the church was long. In the same spirit of ornamental grandeur, the buttresses, supporting the upper part of the nave, instead of being concealed in the roofs of the side aisles, were brought into view with suitable decorations, and made to stretch over the tops of those aisles, in which are called flying buttresses. The window no longer confined of an arch divided by a simple mullion, and furnished with a single or a triple roll, but was henceforward, in all grand churches, portioned out by mullions into three, four, five, six, and sometimes into nine different bays or days, as the separate lights in a window were then called; and these again were frequently subdivided by one or more transtoms running across them. Their heads also were varied by tracery work to a variety of architectural design, and sometimes, as at the west end of York, into the form of a beautiful flower. The plain nitches of the thirteenth century became, in the fourteenth, gorgeous tabernacles, in which as much architectural skill was often displayed as in the whole church to which they belonged. These tabernacles, as well as various other parts of the faceted edifice, were filled with statues, which frequently showed equal spirit in the design and art in the execution. Finally, the ribs supporting the groined ceiling were no longer simple intersecting arches; but they branched out into tracery work, still richer and more elegant than that in the grand windows of this period; and wherever the ribs met, they were tied together by an architectural knot or boss, which generally exhibited some instructive device. It must not be forgotten, that during the latter part of this period, the pediments which before had been upright, began to humour the sweep of the arch, by which means they became less plain and more graceful.

We have instances of these improvements, or rather of this new order of the pointed style, in the three remaining architectural crosses, erected by Edward I. thes of Norbridge, Geddington, and Waltham, to the memory of his queen Eleanor, who died in 1290; likewise in the magnificent tomb of his brother Edmund Crouchback in Welfinlbury abbey, which departed this life in 1296. But the most complete specimen of the whole detail of these improvements is York Minster, the nave of which, as it stands, was built between the years 1299 and 1330, and the choir some thirty years after the latter period. If any similar structure in the same style, but upon a smaller scale, could, in its time, have vied with this in beauty and grandeur, it was St. Stephen's chapel, Wellminister, now the house of commons, which Edward III. began to erect in 1348. Of the innumerable beauties of the latter erection, only a few scattered vestiges remain, to show the architectural antiquity which it was in its glory. There are few, if any, of our cathedrals and remaining abbey churches which were not rebuilt or restored in some considerable part or other of them, according to this improved order. Before 1321, bishop Langton had added the Lady chapel to his cathedral of Litchfield, had groined the nave and choir, and had erected the magnificent western façade. About the same time the greater part of the nave of Wellminster abbey church was rebuilt. Between the years 1237 and 1340, Exeter cathedral was groined, and its heavy Norman arches and pillars were changed into light and graceful pointed arches and clouter-columns, by its munificent prelate Grandison. During the pontificate of archbishop Courtenay, which began in 1381, and that of his successor Arundel, the nave of Canterbury cathedral was rebuilt. During the same period that eminent prelate and architect, William of Wykeham, was employed in performing the same difficult transmutation of the nave of Winchester cathedral, which had been performed in that of Exeter. The circular columns and arches were not taken down, as has been generally supposed, but the former were caled and the latter reduced to a point. This may be ascertained by an attentive examination of the work within the roofs of those structures; and without this trouble, by simply looking at the nave of Gloucester, St. Albans, or Romley great church, where the operation here described will appear to have been performed, on two or three of the circular pillars and arches at the west end, and to have been left off with respect to the other pillars and arches. The taste for these improvements defended even to country parish churches, few of which did not sooner or later exchange their ancient windows, at least, for those of the pointed style.

But human arts, like the human body, when they have attained to the perfection of their state, tend towards their decline. This was the case with that angular invention, pointed architecture. Its rise, progress, and decline, occupy little more in the chronology of the world than four centuries. As its characteristic perfection confined in the due elevation of the arch, its decline commenced by an undue depression of it. This new style, or third order of pointed architecture, took place in the latter part of the fifteenth century, and its be born in the royal chapels of St. George, Windor, of King's college, Cambridge, and of Henry VII., Welfinlbury. It cannot be denied, that the builders of these splendid and justly admired structures displayed more art and more professional science than even their predecessors had done; but then they dis played this at the expense of the whole work, which they cultivated, and of the awful and devout impressions which this style was invented to excite. The spectator was now amazed to see huge masses of stone, called pendent capitals, each one of more than a ton weight, hanging in the air, which, instead of supporting the vast groins they were fixed in, were supported by them; the consequence of this, however, was to bring the flat arches of the ceiling still nearer to the eye, so that their curvature was henceforward discernible at their springing rather than at their point. Finally, ingenuity was at this period much more affected than awfulness; hence these royal chapels, and several mortuary ones built in Winchelster, Peterborough, and our other grand churches, during the time of the two last Henrys, are been covered over with tracery, and loaded in their groins and friezes with bulls, armeal bearings, and retables, beyond all due proportion, so that, however elegant the design, and exquisite the execution of them generally is, a judicious spectator, after adoring them, fails not to prefer to them the chapel-grandeur of York Minster, or even the unadorned majesty of Salisbury cathedral. The church-windows of this period were too multiplied and enlarged, as to become what a late writer, Mr. Whittington, proffestes to admire "all window," but which they certainly could not become without great detriment to the character of awfulness in the church itself. The face depression of the pointed arch took place on the outside as in the inside of the buildings of this period. Instead of the tapering pinacles and lofty spires which had hitherto adorned the towers of churches, these structures were now generally covered with round cupols, and the portals, instead of being forgiowed with corombed pediments and graceful pinacles,
were generally enclosed within square architraves, the chief ornaments of which were seen in the spandrels. All this, however, is to be understood with some exceptions. For example, bishop Oliver King erected his church at Bath, about the year 1160, in a veryimple fasion of pointed architecture, and bishop Fox repaired the prebendary and chancel of Winchester cathedral with a chaste and tasteful elegance.

But the downfall of pointed architecture in this kingdom became inevitable from various causes, chiefly, however, from the loss of its characters of majesty and awfulness, the necessary consequence of the depredation of its fulminating and graceful arch. The declension of it was complete at the beginning of the reign of Edward VI., from which period, till the introduction of the pure Grecian style in the reign of Charles I., a real Gothic, or at least a truly barbacian style took place, confounding a confused medley of all the known styles and orders of styles, intermixed with globes, triangles, pyramids, obelisks, frets, and other whimsical and ugly devices, as may still be seen in the sepulchral and other monuments of the period in question.

From what has been said, it appears that the term Gothic architecture is an improper one, as applied to any species of architecture whatsoever; that the mode of building which prevailed amongst our ancestors before the conquest, called the Saxon style, consisting of round pillars with rude capitals and bases, and of circular arches, was strictly Roman, being copied, even to its minute ornaments, from coeval originals at Rome, and having been first taught and practised in this island by Roman masters; that this style was succeeded, before the middle of the twelfth century, by a style of architecture perfectly new, the essential character of which is the pointed arch, from which, by a natural process, the slender column, the aspiring cornice or pediment, the crocketed pinnacle and lofty spire, with other ornaments mentioned above, actually grew; that this style was not borrowed from Northern Goths, or Eastern Saracens, or Western Normans, or Southern Italians (for in this style the Italians themselves were but novices, and not very apt ones), but that it was discovered in this climate, most probably by the English Normans, the greatest people of the 12th age, and the fondest of ecclesiastical architecture that ever existed; that the style was improved by the joint efforts of the Normans, English, and French, at a time when our kings were masters of the fairest provinces of France, and brought to its perfection, chiefly by the ingenuity and industry of the English, during a period in which England was in prosperity by her conquests, and France in declination from her defects; that there are three distinct orders in this style, the members and proportions of which can be distinctly pointed out by professional men, (such as the author of the "Ancient Architecture of England") with almost as much accuracy as those of the five Grecian orders; on which subject it may be observed, that the five Grecian orders were practised long before their members and proportions were accurately laid down, that the characteristic of the first order is the acute arch, and that the period of its duration may, in a general way, be said to have last from the middle of the twelfth to the end of the thirteenth century: of this order, Lincoln, Beverley, and Salisbury churches are examples; that the chief characteristic of the second order, is the perfect or equilateral arch, the reign of which was from the end of the thirteenth, till after the middle of the fifteenth century, to which order York Minster, and the naves of Winchester and Canterbury cathedrals belong; and that finally, the characteristic of the third order is the obtuse arch, which grew into fashion about the half-mentioned period, and lated to the downfall of pointed architecture itself in the middle of the sixteenth century. The finest specimens of this, doubtless, are the above-mentioned royal chapels. With respect to the proper denomination of this style, some of the learned, as well as the vulgar in general, still call it the Gothic, others the Saracenic, a third class, the Norman, a fourth, the English, and a fifth, the pointed. From the whole of what has been said above, it will be readily concluded, that the present writer conceives the last of these terms to be the best adapted to the style, as being the most strictly descriptive of its characteristic quality.

This article is the abridgment of a much longer treatise on pointed architecture, which is shortly expected to appear from the pens of Mr. Taylor's Architectural Library; in which treatise many historical documents in support of the present system, and certain plates to illustrate it, will be seen.

M.

Gothic Bible. See Bible, and Argenteum Codex.

Gothic Character, or Writing, is a character or manner of writing, which, in the main, is the same with the Roman, only that it is very full of angles, turns, and bendings, especially at the beginning and ending of each letter.

The manuscripts in Gothic character are not very ancient. Ulphilas, bishop of the Goths, was the first inventor of the Gothic characters, or the first who composed the Gothic alphabet, in imitation of the Greek, and the first that translated the Bible into the Gothic tongue.

The letters used in the Gothic gospels are twenty-five in number, and formed, with slight variations, from the capitals of the Greek and Latin alphabet. As these characters, in which the Codex Argenteus, or Gothic version of the Bible, was written by Ulphilas, their inventor, were derived partly from the Greek and partly from the Latin, Michaelis (Introduct., to the N. T.) thinks it natural to ascribe the said version not to the Franks or Germans, but to the Goths, who lived on the borders of the Danube; or in Wallachia, where they at that time reposed, the Latin was spoken, and their nearest neighbours were the Greeks. A mixed alphabet, such as that which is found in the Codex Argenteus, is such as might reasonably be expected. Some of the words in this version are still used in the Leffer Tartary, the ancient seat of the Goths; e.g. vctian, of the, from saecula, age, a word that is quoted by Butbeck, from the language of the Crim Tartars. In this version, many words are adopted immediately from the Greek; vec, sove, atta, father; unc, water, &c. Hence it is inferred, that the dialect, in which such words occur, was that of a nation that lived in the neighbourhood of the Greeks. This version has also Selavonian words, such as sun, a matter, which prove it to have been written in the dialect of a nation that bordered on Sarmania. The name may be said of many Latin words: such as annuntian, to announce, to fit at table, militundium, militantes, foldiers, aghiti, water, &c. This argument is the more decisive, when we consider, that the Goths, in the time of Ulphilas (see his biographical article) lived in Wallachia, a country in which Roman colonies had been planted, and where a corrupt Latin is spoken at this very day. Ulphilas himself lived in Wallachia, and had it in his power at least to make use of Latin letters, as well as those of the Greeks, with whom he had continual intercourse. See Gothic Language.

The Runic characters are also frequently called Gothic characters. See Mokieus, De Re Diplomatic. lib. i. cap. 2.
But they who take the Gothic characters to be the same language as the Runic, are mistaken; as is shewn by Ol. Wormius, Junius in his preface to the Gospels written in Gothic letters, and Dr. Hicks on the Runic Tongue.

Gothic Column is any round pillar in a Gothic building, either too thick or too small for its height.

There are some found even twenty diameters high, without either diminution or swelling.

Gothic Language, the language of the Goths. This language, as the acknowledged parent of the English, is of considerable importance; while its remote antiquity, the facility of its records, and the circumstance of its having been ruined only by few among the learned, have rendered it a matter of great uncertainty as to its character and origin. The question respecting its antiquity and genus is resolvable into those in regard to the people who used it. Mons. Mallet, in his "Northern Antiquities," supposes that the ancient Galls and Germans, the Britons and the Saxons, were all originally one and the same people: and thus he makes the Gothic the same language as the Celtic tongue. This opinion, which was first taken up by Clavirius in his "German Antiquities," has been since adopted by Keyser in his "Northern and Celtic Antiquities," and Pelbottier in his "History of the Celts," and maintained by them with uncommon erudition. According to these writers, the ancient original inhabitants of Europe consisted of two distinct races of men, viz. the Celts and Sarmatians; and from one or other of these, but chiefly from the former, all the ancient nations of Europe are descended. The Sarmatians, or Sauromatae, were the ancestors of all the Seluvian tribes, viz. the Poles, Ruffians, Bohemians, Wallachians, &c. who continue to this day a distinct and separate people, extremely different in their character, manners, laws, and language from the other race, which was that of the Celts; from whom, as they suppose, were descended the old inhabitants of Gaul, Germany, Scandinavia, Britain, and Spain, who were all included by the ancients under the general name of Hyperboreans, Scythians, and Celts, being all originally of one race and nation, and having all the same common language, religion, laws, customs, and manners.

This opinion, though supported with an uncommon display of deep erudition and a great variety of specious arguments, is controverted by the late learned and ingenious Dr. Percy, in a preface to Mons. Mallet's "Northern Antiquities," which he has translated and enriched with notes. This profound antiquarian, in opposition to the French writers, states that ancient Germany, Scandinavia, Gaul, and Britain, were not inhabited by the descendents of one single race; but, on the contrary, divided between two very different people; the one of whom he calls with most of the Roman authors, Celtic, who were the ancestors of the Galls, Britons, and Irish; the other Gothic or Teutonic, from whom the Germans, Belgians, Saxons, and Scandinavians derived their origin; and that these were the original two distinct people, very unlike in their manners, customs, religion, and laws.

The Gothic, then, is radically different from the Celtic according to Dr. Percy, who, in the preface of his "Institutions Grammaticales Anglosaxoniæ," gives the following genealogy of the two languages. Gothic is the parent of 1. Old Saxon, or Anglo-Saxon; 2. Francic or Franco-Theotic; 3. Cimbri, or Old Icelandic. From the first, viz. the Anglo-Saxon, are again derived English, Broads Scotch, Belgs, or Low Dutch, and Frile. From the Francic, are derived German, or High Dutch, German of Swabia, and Swiss; while the Cimbri, in its turn, gave birth to the Teutonic, Norwegian or Norfe, Danish, and Swedish. On the other hand, the Gothic is represented by the name writer as the parent of the ancient Gaul, the ancient Britons (ramified into the Cornith, Armorican, or Bas-Bretagne, and Welsh,) and the ancient Trifon, which was subdivided into Marks, or language of the Isle of Man, into Erle, or Highland Scotch, and Irish. To the old mother tongue of all the Gothic dialects, it has been usual to give the name of Teutonic, not as much as Dr. Percy affirms from its being the language of Tufts, the great father and deity of the German tribe, as from the Teutones, the people who used it: the same probably with the Cambrics, or as the Greeks called them Lygions, who inhabited the northern regions, and more particularly the Danish islands. Now, in opposition to this writer, we are free to affirm, there is no ground for believing that this mother tongue, whether called Gothic or Teutonic, was in its primitive form different from the Celtic. And this proposition we shall endeavour to make manifest from the very specimens by which Dr. Percy has attempted to shew their essential difference. But before we enter on this question, it is necessary to remark, that learned men, in their enquiries concerning the origin of nations, have not sufficiently attended to the consideration which we learn from the Mosaic history, that all nations originated in a common family, and at first spoke a common language. Let us suppose that some members or descendants of this family, (as we read of Gomer,) emigrated from Asia to Europe. If they settled in Greece, they introduced with them the primitive customs, and language, though somewhat corrupted, no doubt from its original purity. Others, actuated by the same spirit of emigration, would soon follow; and, if more powerful, would displace their predecessors, who had no other resource but to seek new habitations in remote regions.

As these wanderers multiplied, they advanced, till, in the course of years, all the countries on the north and west, as well as on the east of Europe, were completely peopled. But this population of course could not take place before they had been divided into independent tribes, and distinguished by correspondent difference in dialects and manners. But still a very great resemblance must have as yet been visible among them in both these respects, however separated from each other: for in the earlier periods of society, language, though widely used, must long have continued the same, with little variations, it being corrupted and diversified into distinct tongues only by the progress of civilization; by the refinements of literature, by improvements in art and in government, and by those political convulsions which the love of conquest, inspired by conscious superiority in the arts, produces. All the nations of Europe, therefore, in the ruder and more early ages, may be considered as using only the same great primordial speech, grown indeed into distinct branches, and affixing in one country the appearance of being independent of, and unconnected with those used in other countries. Now, if we suppose that the Celtæ were the first emigrants from Asia, who, pervading Europe, settled in Gaul, Old Spain, Britain and Ireland; while their brethren, under the names of Cætæ (Goths), Scythæ, Cimbri, &c. directing their course to the North, occupied Thrace, Scandinavia, and other northern territories; it would follow, that these tribes, however remote, used at first either the same language, or languages which had a close affinity from their relation to the common primal tongue. "Nor would there be material difference in this conclusion, though we should suppose, with many learned men, that the inhabitants of the North of Europe came, not from the East but from the
the North of Asia, as they must still have been descendants of the same primitive family, which, according to Moses, peopled the world. Thus the Celtic and the Gothic or Teutonic must have been, in their origin, the same or sister tongues.

But further, while the ancient Celts and Goths continued in the darkness for which they became proverbial, the inhabitants of Greece rapidly improved in laws and the arts of life. In this improved state, Greece became, in regard to the favoured inhabitants of the North and West, what Asia had hitherto been in respect to Greece, a fresh source of civilization and letters. Its language, growing more copious and refined with the people, diffused itself with the blessings of knowledge and society, which their example or instruction imparted to the Northern and Western inhabitants of Europe. Thus Greek, with the arts of Greece imported into Italy, gave birth to the Latin tongue; and this at a later period necessarily affected the Celtic language, in consequence of the victories which the Roman arms achieved in Gaul and in Britain. This revolution greatly widened the line of distinction which for ages had been extending between the Celtic and the Gothic tongues; the former being assimilated to the Latin, the latter to the Greek, by a copious influx of new terms. It were indeed matter of great curiosity if some records of the Celtic and Gothic tongues had been preferred before they were yet modified by the ascendant languages of Greece and Rome; but no such records unfortunately have survived the wrecks of time. And we can judge of the ancient Celtic only from the Welsh, its acknowledged daughter; while we are left to form our judgment of the primeval Gothic from the remains of a version of the New Testament, effected by Ulphilas, into the dialect used by the Goths in Masna, and hence called Merovingian.

Having made this preface to shew that the Celtic and Gothic had one common basis, viz. the primordial tongue imported from Asia, we proceed to prove, as far as we are able from their respective offsprings, that they had in common many Asiatic words, and were modified by a great portion of Latin and Greek terms; and that from these two causes they essentially resembled each other. The Lord's prayer is thus rendered in the ancient Gothic of Ulphilas:

LITERAL TRANSLATION:

1. Attā unfar thu in himnam
2. Velihni name thein
3. Quinah thudindus theins
4. Vairalh Vilga theins fæ in himnam, gah anu airthai
5. Hlaif unferana thana fin timan gis uns himmordag
6. Gah afeit uns theae feu lans figaima, fia fæ gah wis ailetam than feu lam unferons
7. Gah ni bringais uns in fæthilbogai
8. Ak lufei uns athamma
9. The following is a specimen of the Celtic, as existing in the Welsh tongue:

1. Ein Taed, yr lwan wyt yn y Nefoeth
2. Santeiddler dy enw
3. Dewed dy deyrnas
4. Bydded dy Ewlylys ar y ddaear meigis y maen yn y neveth
5. Dyro i ni neidrwy ein bara bymfyddi
6. A maddi Ani ein Dyledion fel y maddeun ni ein dyledwy
7. Ag ma arquin ni i brefodegaeth

We propose next to lay before our readers a brief analysis of the first two specimens, which it is prefixed will shew that the two languages in question have much nearer resemblance to each other, than Dr. Percy, or any person who has not a thorough knowledge of both, could possibly imagine. The Hebrew יִתֵּר, thad, pronounced with an initial and closing vowel, is adda, and signifies beloved, and this is the source of the Gothic atta, and the Greek αὐτός, with the udmth propriety applied to a parent as the dearest object of love. The same word in Hebrew is written יִתֵּר, dood, and is other than the Celic atta, under a difference of character. In the Cornish it is taw, in the Frisic katas, in the Landb at, and the old Cantabrian or Bifeykan atta, father. Unfer is the Greek ἀντίς, thus strangely corrupted, ἀντός, untar, unfer; and hence the English our. In the same manner, argaes: has degenerated into unis, wis, ws, us. The Celtic ni is the Hebrew and Arabic pronoun N,N., ani, which, founded with only the closing vowel, is ni, ws, and with only the initial ein, our. The Gothic in and the Welsh ysa have originated in the Greek ης, or the Latin in; but it is observable that both these languages use this preposition as it is used in Latin, when followed by an accusative noun in the sense of into, untar, or to: thus in freistafhagai, into temptation; inni, or i ni, to us. The Welsh language is remarkable for the attention paid to harmony in the arrangement of its terms. To produce this effect the termination of a preceding word, in order to coincide with the faceeceeding one, is somewhat changed, and thus made to unite both into one. Thus urine is yr hwan, the one, where y or ei (aspirated after the manner of the Greek ἕμι), is prefixed to ein, the Latin unus, or the Anglo-Saxon an. Ysa, moreover, is a coalition of any y, air thow, or thou art; by being the substative Greek verb εἰς, whence the Goths derived their in, and the English our on. The Greek γίνεσαι, to partake of, from the Latin innus, or the Anglo-Saxon ann, is, with the ablative case ysa, or ysa, in which the Goths derived their in, and the English our on. The Greek γίνεσαι, to partake of, from the Latin innus, or the Anglo-Saxon ann, is, with the ablative case ysa, or ysa, in which the Goths derived their in, and the English our on.
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Ae is the same with the Gothic thu, and no other than the Latin tu, or the Gothic tu, or the English thou. The Gothic thian, it is obvious, has given birth to the English form of the. Nouns, whence our name, retains the Persian character of nana, though perhaps it is more immediately derived from noman, and is a kindred noun with the Welsh cans, which probably degenerated from *cans, by dropping the last syllable.

3. The Arabic ܐܢܛܝܢ, quoum, lega, has given birth to the Gothic quomin, to uso the legs, i.e. to come, and to the Anglo-Saxon cynman, and our can. The same word has been imported into the Celtic in the shape of canmn, signifying to hop or hop. The same word exists in the Skanfur, quomun, to go. The corresponding Welsh lefn when you walk, is the Greek κανή, κανα, or κανον, to stretch to an object, which was defended from the Arabic ܐܢܛܝܢ, ana, by dropping the initial vowel. The same verb exists in Welsh, under the different figure of thyen or thygyn, and is no other than the English to conduct. The Gothic thulmam, a kingdom, seems originally to have meant the emperor of a federal nation, from the Greek τυράννον, and τυραννίς, or τραγάνον, as the offspring of the former exists in this tongue, theoyn, gen., popularis. On the other hand, the Welsh dyfon is the Greek ἴσων, corrupted, by the transposition of b, into thesos or dyes. Our English throne, conforms to the original in sound and sense. In the Anglo-Saxon the corresponding word is reo, which still exists in such English compositions, as kiboric, i.e. the dominion of a bishop. In the Great Indian language abovementioned, this term suffices under the character of ryo, meaning wealth, and which is nearly the same in sound and sense with the Anglo-Saxon reo, or our riches, and the Latin rex, property.

4. As light or air is the chief medium of existence, the Hebrew term אָרָא, aer, gave birth to the Latin exam, air, and the Gothic avari or ovirban, to be, to become. The Welsh eddlyd, which exists also in the form of llyd, and which is the same with the Greek ἀέρ, and the Latin vind, defended from the Perisan badan, to be, and šen in Arabic, or volo, with ga annexed, by an analogy common in the Gothic tongue. The Welsh eddlyf, or with a prefixed, caddlyf, has flowed from the same source; and under the former of these forms is nearly allied to the English will. Sue is our so, or the Greek is reverend, a fate very common with monophyllals in the ancient languages. Gab came from gab, and ana from aer, which, in composition, means up, and has given birth to the Gothic sense of upon. Airhat is the Arabic arad, from the Hebrew ܣܢܪ, arees, while the Welsh daur, or as it is otherwise written, aw, originated in tana. The Hebrew ܐܢܛܝܢ, abor, the parent of *e in Greek, of or in German, ofer in Gothic, and over in English, has contracted in Celtic into ar, in the sense of upon.

5. The Arabic ܐܢܛܝܢ, abedh, food, is the origin of the Gothic blys, and the English loaf. Thaxan, or iban, is the accumulative article in. Sinimine is formed from the noun feish, significat, change, which is no other than the Hebrew אָנָשׁ אָנָשׁ, feish, that change or period of time called a year; hence sinimine came to signify continual, or perpetual. Our Lord, we believe, by the clause πάντα ἐν ἀμώθων, meant not, as it is generally rendered, daily bread; but the bread belonging to us, and essential to us as immortal beings, namely, the bread of the soul. (See 'Mr. Jones's Illustrations of the Four Gospels,' p. 123.) In this sense the clause was understood by the early commentators, and by the Gothic translator, who has rendered it blis thana sinimine, the eternal bread. In Hebrew, Arabic, and Persian, ܢܡ, keph, denotes the palm of the hand; hence it came to signify the action of the hand, which confines either in imparting or receiving. In the former sense it gave birth to the Gothic ges, and in the latter to the Latin capio. Hinnid is means this day; biusma, or as we write it, bien, being the personal pronoun used definatively, and diog or dogt, according to the Anglo-Saxon, being the Latin dies; his day for this day, which is more common in the plural form among the vulgar them days.

The Welsh dyro, in the same verse, is the Greek ἴσος, a gift, converted into a verb. Hedyso is a distinguished form of bodhi, which last is only a contraction of tene die, this day. Bars is a word which exists in all languages. Its origin is the Hebrew בָּרֶז, phobos, fruit; and hence τερίς in Greek, far, and paris in Latin, brod in Cimbri, brot in Francic, broade in German, broada in North, broad in English, broad in Danith, and broac in Frisic. Brnydydd, rendered daily, appears to be composed of bymn, a top or summit, and yddhel, the Latin dies advertised, and means a top of each day, or a head of each day, i.e. daily. The words is also used brnydylah, being a corruption of pen, a head. The Welsh word for the plural of this expression, and have a phraste, poby dyth or y pen, each day on his head, meaning every day in succession.

6. After us, i.e. of let, or it self, diffuses to us. That is a corruption of the Greek ὑπὸ, this or that thing, and is thus the parent of the English that; hence the reasonableness of the explanation which the celebrated Mr. Tooke has given of such phrases—remit us to that thing, vis. falsum sigcima, we are debtors. Seulans were persons under command, under obligation or debt, from the Greek εὐκλαύσιν, to labour; hence appears to have been derived our seulion, a mean domicil servant. In ancient times labourers usually paid their rents in kind from the products of their fields; hence, in Greek, the tenant was called χρυσόμακας. On the same principle, in Gothic, the word signifying to labour, came to signify to owe, or to be in debt. Sigcima is only the Latin fiasm corrupted by the inlocation of gen, a particle of frequent use in Gothic. The Welsh a mabath, or as it may be written, ammadheus, is a composite of ag maddy, and remit, the first being the Latin conjunction as, the second the Greek αὐτῆς, the same with *αὐτῆς, to signify or remit. Dydek, the plural of dykel, is the Latin delecta, things to be enjoyed, or to be cancelled by being paid, i.e. debts. The noun sun, or the plural sun, which in this tongue is so often added to the name of a thing, is but the Latin vin—dydegyn, debsmen or debtors.

7. The Goths and Anglo-Saxons corrupted *vas into byvan and bringan, and hence our to bear, and to bring—ni bringan, do not bring us. The Latin nē in Gothic is ni, in Anglo-Saxon and English no, in Welsh na or nog. Fraytun, is the corresponding noun of frajtin, to tempt, and appears to have been borrowed from the Latin praefectus, and therefore primarily meant praefectus, praetextus. The Welsh arawin is the French ren with the vowel π prefixed, and is the same with our rin: its proper sense is to lead a horse with a bridle. The French, in deriving words from the Latin, generally reject the guttural in the middle or at the end; and on this principle the root of ren is ren, to rule, direct. Preflected strictly denotes experience, and its origin is the Latin probe, which last is itself taken from the Greek κτισθ, puiwre, or the corresponding verb κτισθε, to taste or chew.

8. The Gothic ak is the Latin ac, though used by the latter in a conjunctive, by the former in a disjunctive sense—but. The root is παρ, or the whence derived augs, whence the Gothic auges: and ak, conformably to the form of this
GOTHIC LANGUAGE.

The corresponding Welsh word is eithir, derived from *eitres, another. The explanation of it is this—lead us not into trial; another thing, i.e. do another thing, namely, deliver us from evil; on this principle the conjunction *axa, *bat, originated in *æxox. *Launf, which has given birth to various words in Anglo-Saxon and in English, and among the number to *laufs, left, *lauffs, releafs, let, is apparently the offspring of the Hebrew *לוּף, *lôof, *doeds, *redoeds; to deliver from evil is but to caude to escape from evil, and thus launf corresponds in form as well as in sound to the original. A bove character is a character freed or loosened from the rules of sobriety and justice, and this deviation from rectitude is implied in the original *לוּף; while the compound releafs comes close to the Gothic signification of launf, to deliver. The Welsh which answers to this is *gweard, and is no other than the Latin gero, (properly pronounced gero,) to manage, to carry. The Arabic *جدل, *jedal, is the origin of our word *free, its primary sense. Being thence applied to men, it came to signify those who were the heads of families, or who went before them: hence it was used to convey the more general and abstract ideas of precedence or beginning; in this sense it is the origin of *ψλλ in Greek, *pre in Latin *free or from in Gothic, *flua in Cumbric. In the Anglo-Saxon *we is annexed, and hence our word from, though the Scotch use it in the original purity of senses. The corresponding Welsh *ebeg, which means *fair, *distance, has retained with great exactness the found and sense of *ψλλ, *ebak, its Hebrew original. The Gothic *abai, German *ebel, Anglo-Saxon *ifas, and English evil, is the Perian and Arabic *ṣbl, *balba, with a vowel prefixed. The Perian *tawil, is the parent of the English dark: and as darkness was the symbol of evil, or of the suppos'd demon which created it, the Celts received it to express evil under the form of *drag; and it is remarkable that the same word with *αλ*πετριτυμιν is used by the Greeks to denote a contrary sense—*ψαλλων, *not dark, ingenuus, *finer, *true. In the same language *ψαλλω means an *impoñor, which the lexicographers, misled by mere similarity of sound, have erroneously referred to *ψελλω, to eat.

From this analysis, which we hope is worthy the attention of the learned, we shall draw a few conclusions respecting the Gothic tongue. First, it appears to resemble the Celtic, in having a common primitive basis, and in containing a copious influx of Greek and Latin words. As the two languages were not essentially different, there is no foundation for supposing, with Dr. Percy, that the Celts and the Goths were originally distinct races of men. And here we cannot help specifying a feature in these tongues, which, in a remarkable manner, bespeaks their original identity, or their immediate descent from a common parent.

The Gothic, with its offspring the Anglo-Saxon and the German, uses the particle *ga or *ge prefixed to words, and especially to verbs. The Gothic sometimes inflects *g in the middle of words, and frequently before the infinitive termination of verbs: *gæa, or *agere, is *wæppian, and *gæon to deride, *blægian, to laugh. In consequence of this analogy, words borrowed from Greek and Latin are remarkably disguised, and they must be stripped of this peculiarity before they can be traced to their true origin. The Celt, if we may judge from the Welsh, was distinguished among the former characteristic feature; thus, the Latin war is *gær; *gæm, *gæm, *gægen, *gæg; &c. On this principle *fæs, *fæs, *af, in Welsh is *megs, which bears the sense of the original. The identity or similarity of the two languages will account for the Goths and Celts being called by the common name of Cimmerians or Cimbri, which the true Britons, the undoubted descendants of the Celts, still inherit under the name of Cymri.

Sir W. Jones, in his sixth discourse delivered to the Society at Calcutta on the antiquities of Asia, has the following passage well worthy of our attention, as tending to confirm, in a remarkable manner, the result of the preceding inquiry. The passage is this: "It has been proved by clear evidence and plain reasoning, that a powerful monarchy was established in Tartary long before the Affyrian government; that it was in truth a Hindoo monarchy, though, if any chief to call it Cyclic, Cadinean, or Scythian, we shall not enter into a debate on mere names; that it sublimed many centuries, and that its history has been ingrafted on that of the Hindoos, who founded the monarchies of Ayodya and Indrapratha; that the language of the first Persian empire was the mother of the Sanscrit, and, consequently, of the Zend and Parth, as well as of Greek, Latin, and Gothic; that the language of the Affyrians was the parent of Chaldæan and Pahlavi, and that the primary Tartarian language also had been current in the same empire; although, as the Tartars had no books, or even letters, we cannot, with certainty, trace their unpolished and variable idioms. We discover, therefore, in Peria, at the earliest dawn of history, the three distinct races of men, whom we described on former occasions as possessors of India, Arabis, and Tartary; and whether they were collected in India from distant regions, or diverged from it, as from a common centre, we shall easily determine from the following considerations. Let us observe, in the first place, the central position of Iran, which is bounded by Arabia, by Tartary, and by India; whilst Arabia lies contiguous to Iran only, but is remote from Tartary, and divided even from the shores of India by a considerable gulf. No country, therefore, but Peria seems likely to have sent forth its colonies to all the kingdoms of Asia; the Brahmins could never have migrated from India to Iran, because they are expressly forbidden by their oldest existing laws to leave the region, which they inhabit at this day; the Arabs have not even a tradition of an emigration into Peria before Mohammed; nor had they, indeed, any inducement to quit their beautiful and extensive domains; and as to the Tartars, we have no trace in history of their departure from their plains and forests till the invasion of the Medes, who, according to etymologists, were the sons of Medes, and even they were conducted by princes of an Affyrian family. The three races, therefore, whom we have already mentioned, (and more than three we have not yet found,) migrated from Iran, as from their common country; and thus the Saxon Chronicle, I presume on good authority, brings the first inhabitants of Britain from Armenia; while a late very learned writer concludes, after all his labours and researches, that the Goths or Scythians came from Peria; and another contends, with great force, that both the Irish and Old Britons proceeded severally from the borders of the Cæpians; a coincidence of conclusions from different media, by persons wholly unconnected, which could scarce have happened, if they were not grounded on solid principles.

We may, therefore, hold this proposition firmly established, that Iran or Peria, in its largest sense, was the centre of population, of knowledge, of languages, and of arts; which, instead of travelling westward only, as it has been fanciously supposed, or eastward, as with equal reason might have been asserted, expanded in all directions to all the regions of the world." Here we see it stated, as the result of Sir William Jones's inquiry, that the Goths, the Irish, and the Old Britons, or the Celts, were originally the same people, and
and of Asiatic origin; that they used the same language derived from the primitive language of Asia; and this he gives not merely as the consequence of his own investigation, but as a coincidence of conclusions, through different media, by persons wholly unconnected. "We know not whether this great man was aware of the great similitude subsisting between the Gothic and the Celtic tongues. From his silence we may conclude that he did not; and if he had been specimens of them, analyzed similar to that above, he would have deemed the resemblance a surprising confirmation of his theory.

We conclude, in the second place, from the above analysis, that the Gothic had a close affinity to the Greek and Latin. And Sir William Jones gives it as his opinion, that the Greek, Latin, and Gothic originated in one and the same language; namely, the ancient language of Peræa. These three languages, therefore, originally resembled each other, not merely because they borrowed some words from one to the other, but because they had the same words, phrases, and even consonation, in consequence of having derived them from a common tongue. And here we cannot help mentioning one feature in which the ancient Gothic bore a very singular resemblance to the Greek in the time of Homer, or that dialect of the Greek (namely, the Æolic), from which the Latin was principally derived: we mean the much disputed Æolic digamma. In the Oriental languages gutturals abounded; these, by degrees, softened into a mere aspirate; and for this aspirate, in very numerous instances, substi-
tuted a labial letter $v$ or $w$, or $f$, or $z$. Thus $vóizó$, a king, degenerated into $hóizó$, and being introduced into Greek in the form of $\omega πίζο$, or $\omega μποξά$, was pronounced $\omega υίζο$, $\omega μποξά$. While the oral Greek was thus corrupted, the written retained the aspirate; and as the works of Homer became the subject of universal study, the true orthography triumphed over the caprice of oral sounds. But the Latins had no such monument of genius as the Iliad to study; the corruptions of pronunciation, therefore, prevailed, and the digamma was universally sublimated for the aspirate. Thus $\váxy$, $\válbh$, $\véxy$, $\vélbh$. The digamma was also pre-
fixed to a broader open vowel, and always inserted between a diphthong, as $\vá$, pronounced $\váα$, $\vá οι$, $\vá οο$, $\vá υυ$, $\vá οιο$, $\vá υυο$. Now, this same digamma runs through the Gothic language, which shows that a great part of it, through some channel or other, was derived from the Greek; about the early age in which the Latin separated into a distinct dialect. We shall give a few examples of this fact. The Greek αφεξ, in Gothic, is written conversa-
tially to the corrupt pronunciation of $\omega ραξ$, $\váαξ$; $\váαξ$, $\váαξ$, is $\váαξ$, $\váαξ$, $\váαξ$; $\váαξ$, (which is equivalent to $\váαξ$) is $\váαξ$, $\váαξ$, $\váαξ$; hence the English, to work.

But though the Greek may have the same form and bals with the Gothic; and though by some communications, now unknown, it may have enriched the Gothic with its own early improvements, yet the dialect dignified with this name is only the remains of the Gothic tongue, debased by a strong mixture of Greek and Latin terms, a century or two after the commencement of the Christian era. The Goths who used it lived in Wallachia, a country in which</p>
GOTHLAND, a country of Sweden, bounded on the N. by Sweden Proper, on the E. and S. by the Baltic, and on the W., by the Sound, the German ocean, and Norway. This country is inhabited by a people, who derived their origin from the Gotte, or Tartars of the Crimea. The Goths had kings of their own, till the year 1132, when they were united to Sweden. The country is pleasant and fertile, confiding of pasture and arable land; and abounding in lakes and rivers plentifully stored with fish, and also with forests and mines. It contains 48 towns, and is divided into East, West, and South Gothland.

East Gothland is bounded on the N. by the provinces of Nericia or Nerike, and Sodermanland, on the E. by the Baltic, on the S. by Smoland or Småland, and on the W. by the Wetter lake, which separates it from West Gothland. It is about 80 miles long, and 70 broad. It produces wheat, rye, barley, oats, peas, &c. in such abundance as to supply the neighbouring provinces. It has likewise many fine orchards, with meadows, pastures, lakes, and rivers abounding with fish, extensive forests, iron-mines and foundaries, and quarries of stone and marble. The inhabitants are occupied in husbandry, hunting, and fishing, and also in some places in the mines. The chief towns of this province are Nordkoping, Soderkoping, Linkoping, and Vadstena, which are respectively.

South Gothland is divided into three provinces, viz. Schonen or Skone, Halland, and Blekingen, which have at busy times changed their masters, till at length Charles Gustavus annexed them for perpetuity to the Swedish dominions, by the treaty of Roschild, in the year 1658.

West Gothland is bounded on the N. by Warmeland, on the E. by Nericia, the Wetter Lake, and Småland, on the S. by Småland and Halland, and on the W. by the Scuggerac. It is about 115 miles long, and 15 broad; like East Gothland it was under the administration of its own kings and laws. The soil produces corn, vegetables, and fruit; and affords excellent pastures, which enable the occupiers to supply other provinces with butter and cheese. The rivers, lakes, and sea-coast abound with fish; and in several places are erected iron-forges, alum-works, paper mills. The inhabitants are chiefly employed in agriculture and fishing. The chief towns are Gothenborg, Wenneborg, Lidkoping, and Falikoping, which are respectively.

Gothland, or Gotland, an island belonging to Sweden, situated in the Baltic, between 56° 54', and 57° 56', and E. long. 18° 6', and 19° 6'; about 70 miles long and 23 in its greatest breadth. It was formerly an independent kingdom, but is now subject to the supreme court of justice at Stockholm. Its situation has gained for it the appropriate denomination of the "Eye of the Baltic." The soil is fertile, and affords fine woods of oak and pine, and good pastures; and its breed of sheep is accounted excellent. It has large quarries of stone, which is exported to Stockholm and other places, and some curious species of stone and marbles, cancellas, agates, and beautiful petrifications. It furnishes likewise good lime-dones, tar, and deal-boards. Although it is not infested with bears or wolves, it abounds with foxes, deer, and hares. The inhabitants gain their subsistence by tilling the ground, grazing, fishing, working in the quarries, burning lime, and other sorts of mechanic trades, and navigation. The peasants are in a state of absolute dependence on the burglers, who supply them with necessaries, and with money for paying their taxes, and to whom they surrender the whole produce of their industry, without stipulating any price. This island was at first subject to the crown of Sweden, and afterwards to the Dane for near two centuries, till the year 1625, when by the treaty of Bromebro, it was restored to Sweden. The capital of the island is Wisby, on the western coast.

Goths, a people, who came originally, according to Jornandes (Reg. Get.) who abridges the Gothic history of the learned Cæsariodes, comprised in 12 books, from the vail island, or rather peninsula, called Scandinavia, and including the present Sweden, Norway, Lapland, and Finnmark. The learned Grotius, and after him Sheringham, and most of the northern writers, maintain by arguments, which, as many conceive, have not been refuted, but which are not convincing to others, that the Cimbrians (see Cimbris, Getes (see Gete.)), and Gotes, were the same nation; that Scandinavia was first peopled by them; and that from thence they detached colonies into the islands in the Baltic, the Chermonus, and the adjacent places, yet deficient of inhabitants. Many vellages, which cannot be ascribed to the arts of popular vanity, attest the ancient residence of the Goths in the countries beyond the Baltic. From the time of the geographer Prolemy, the southern part of Sweden seems to have continued in the possession of the left enterprizing remnant of the nation, and a large territory is even at present divided into East and West Gothland. (See Gotland.) The time when the Goths first settled in Scandinavia, and the period at which they first populated their colonies the islands, the Chermonus, and the neighbouring places, have not been ascertained. Some have said, that their first settlement was conducted by Eric, contemporary with Sarah, grandfather of Abraham. However this be, the peopling of the islands in the Baltic sea, of the Chermonus, and of the adjacent places on the continent, is called by the Northern writers, the first emigration of the Goths or Getes. The attempt to cross the Baltic was natural and easy. The inhabitants of Sweden (as we learn from Tacitus) were masters of a sufficient number of large vessels with oars; and the distance is little more than 100 miles from Carlseroon to the nearest ports of Pomerania and Prussia. At least as early as the Christian era, and as late as the age of the Antonines, the Goths were established towards the mouth of the St. Petai, and in that fertile province, where the commercial cities of Thorn, Elbing, Koningsberg, and Dantzig were long afterwards founded. Westward of the Goths, the numerous tribes of the Vandalus were spread along the banks of the Oder, and the sea-coast of Pomerania and Mecklenburg. A striking resemblance of manners, complexion, religion, and language, seemed to indicate that the Vandals and Goths were originally one great people. (See Vandali.) In the age of the Antonines the Goths were still seated in Prussia. About the reign of Alexander Severus, they made frequent and destructive inroads into the Roman province of Dacia. In this interval, therefore, of about seventy years, we must place the first emigration of the Goths, from the Baltic to the Euxine. To what cause this was owing is matter of mere conjecture. Perhaps a pestilence or a famine, a victory or a defeat, an oracle of the gods, or the eloquence of a daring leader, were sufficient to impel the Gothic arms on the milder climates of the south. Besides the influence of a martial religion, the number and spirit of the Goths were equal to the most hazardous adventures. The use of round bucklers and short swords rendered them formidable in a close engagement; the main body of the men, who yielded to hereditary kings gave uncommon union and stability to their councils; and the renowned Amahl, the hero of that age, and the tenth ancestor of Theodoric, king of Italy, enforced, by the ascendancy of personal merit, the prerogative of
of his birth, which he derived from the anfes, or demigods of the Gothic nation.

Whatever was the motive of their migration, they took their route eaitward, entered Scythia, advanced to the Cimmerian Bosphorus, and, driving out the Cimmereans, settled in the neighbourhood of the Maeotian lake. There, in process of time, they sent out numerous colonies into Thrace, Dacia, Moesia, or Italy, and latily into the countries bordering on the Euxine sea, forcing everywhere the ancient inhabitants to abandon their native abodes. Such is the account given by Jornandes, and Ablavius, a celebrated writer among the Goths, who lived long before him. In the vicinity of the Maeotian lake, they had, it is said, Filiimir for their king, who was a warlike prince; in Thrace, Maxia, and Dacia, Xenakiis, a great philosopher; and in the countries on the Euxine sea, princes of the illustrious families of the Balthi and the Amali, the Visigoths being subjéct to the former, and the Ostrogoths to the latter. In all these countries they were the same people, though subjected to different princes, and known by various appellations. As for the denominations of Weltrgoths, softened by the Latins into that of Vifigoths, and Ostrogoths, they were distinguished by the names before they left Scandinavia, being called Weidrogoths and Ostrogoths, or western and eastern Goths, from their situation to the west and east, the former inhabiting that part of Scandinavia which borders on Denmark, and the latter the more eastern parts, near the Baltic. The information we derive from Jornandes concerning the various migrations and settlements of the Goths is conformable to the accounts that are given by the ancient Greek and Latin authors with respect to the different colonies and settlements of the Getes. That the Goths and Getes were the same people, is supposed by all the writers who flourished in or near the times in which both empires were overrun by them. Those authors, without doubt well acquainted with their origin, call them sometimes Goths, sometimes Getes, and sometimes Scythians; and several authors tell us, that the Getes and Goths had been long known to the Romans, and also to the Greeks by the former names, but not by the latter, till their invasions into the empire.

When the Goths greatly increased in Scythia, they resolved to seek new settlements; and accordingly, purposing their route eaitward, and travelling through several countries, they returned at length into Germany. Their leader in this migration was the celebrated Woden or Odin, of whom many strange things are related. It is said by the northern writers, that he was king of the Afdarians, supposed to be the same people with the Afdurians mentioned by Tolemy and Strabo. Afdaria and Afdurgia are said to be a common name of their city, situated, according to Strabo, near Bosphorus Cimmerius; and Afdurgia was the metropolis of a country which Strabo calls Afa; hence Woden and his followers are styled by the ancient Gothic writers Afe, Afani, and Afae. The kings of Afdurgia are represented as being masters of all that part of Scythia that lay west of mount Imaus, and which the Latins called "Scythia intra Imaum," or Scythia within mount Imaus. Of this Afdaria or Afdurgia, Woden is said to have been king; and hence he emigrated with a great multitude of his followers in quest of new settlements; or, as some say, with the great design of forming in Sweden, considered as the inaccessible retreat of freedom, a religion and a people, which, in some remote age, might be subservient to his purposes; when his invincible Goths, armed with martial fanaticism, should issue in numerous swarms from the vicinity of the Polar circle to chastise the oppressors of mankind. Having passed through different countries, and performed a variety of exploits, he at length arrived in Sweden, where he was allowed to settle, and where he reigned till his death. His name became so famous that the northern nations ranked him among the gods, and worshipped him with divine honours. He is supposed to have brought with him out of Asia the Russian characters (see Rusie), and to have taught the northern nations the art of poetry; whence he is said to be the father of the Scaldi or Scaldur. See Scald.

That the Goths, under the conduct of Woden, came from Scythia into the northern parts of Germany, is a received opinion among the northern writers, and, as they allege, confirmed by an immemorial tradition, by the ancient chronicles of those countries, and by many monuments and inscriptions in Runic characters, some of which are still to be seen in Sweden, Denmark, and the neighbouring islands. That there were such migrations can hardly be questioned, since we find the same names common to the inhabitants of Scandinavia and Asiatic Scythia, and likewise the same language, as Grotius, and after him Sheringham, have shown. The ancient language of the Goths is now spoken by the Tartars of Precopus, whence, and from other collateral circumstances, it has been concluded that the Scandinavian Goths and Asiatic Scythians had once and the same original. As to the time of this migration of Saxians under Woden into the northern parts of Germany, those who maintain it have been at least to determine. Some refer it to a period about 244 years B.C; for at that time, they say, Pompey laid waste Syria, and great part of Asia, and marched the north with ferocity. After all, this wonderful expedition of Woden or Odin is admitted with great hesitation, or indeed fearfully admitted at all by many, into authentic history. According to the obvious sense of the Edda (see Edda), and the interpretation of the most skilful critics, in-ward, instead of denoting a real city of the Asiatic Sarmatia, is the fictitious appellation of the mythic abode of the gods, the Olympus of Scandinavia; from whence the prophet was supposed to descend, when he announced his new religion to the Gothic nations, who were already seated in the southern parts of Sweden.

Before we proceed with our brief abstract of the history of the Goths, we shall give some account of their character, customs, laws, and religion, before they embraced Christianity. With regard to their general dispositions and character, they were celebrated for their hospitality and kindness to strangers; and it is said that they derived their name from their being eminently good; the name of Gotli being derived, according to Grotius and other writers, from the German word got, signifying good. They encouraged, says Dio, the study of philosophy more than any other barbarous or foreign nation, and often selected their kings from among their philosophers. Polygamy was not only allowed, but encouraged, and every one was respected according to the number of his wives, and of course his children. Adultery with them was a capital crime, and invariably punished with death. This severity, and likewise polygamy, prevailed among them, when they were known to the Greeks and Romans only by the name of Getes, as appears from the poet Menander, who was himself a Gete, and from Horace (l. iii, col. 24.), who bewails great encomiums on the virtue and chastity of their women. Of their laws we shall have occasion to speak in the sequel of this article. Their government was monarchical. Their religion seems to have been the same with that of the ancient inhabitants of Scandinavia and Saxony; which see respectively. Till the end of the eleventh century, a celebrated temple subsisted at Upsal, the most considerable town of the Swedes and Goths. This temple was enriched with the gold which the Scandinavians had acquired...
in their piratical adventures, and fanctified by the uncouth representations of the three principal deities, the god of war, the goddess of generation, and the god of thunder. In the general festival that was solemnized every ninth year, nine animals of every species (without excepting the human) were sacrificed, and their bleeding bodies flung over the sacred grove adjacent to the temple. The only traces that now subsist of this barbaric superstition are contained in the Tiber, which see. See also Opus.

Caracalla was the first Roman emperor who quarrelled with the Goths, and marched against them into that part of Dacia, north of the Danube, of which they had taken possession; but the advantages which he seems to have gained over them in a few skirmishes were very inconsiderable. It appears, that the Romans were alarmed at an early period by the progress of this warlike nation; for in the reign of Alexander, which began in 222, considerable sums of money were lent to them from Rome, in order to prevent their disturbing the peace of the empire. Notwithstanding these bribes, as soon as they heard of the affaillusion of the emperor Maximin, who was of Gothic extraction, they resolved to revenge it, and accordingly entering Moesia, they totally laid waste that province. Not long after they made themselves masters of Thrace, from which they were driven by Gordian. Under Philip, his successor, they committed dreadful ravages both in Thrace and Moesia. Soon after their retreat from the siege of Marcelluspolis, the capital of the second Moesia, and after having compelled the inhabitants to ransom their lives and property, they passed the Danube a second time, under the command of their king, Cuiva, with a more considerable force; and having obliged Darius the son of the Roman emperor, to save himself by flight, they were opposed by the emperor himself. Darius, having compelled them to raise the siege of Nicopolis, they retired towards Philopappis, took it by storm, and massacred, as is said, 100,000 persons in the sack of that city. The time, however, which was consumed in this tedious siege, enabled Darius to revive the courage, restore the discipline, and recruit the number of his troops, after the defeat they had sustained in their pursuit of the Goths. Thus recovered, the emperor exerted his utmost vigilance to oppose either the progress or the retreat of the barbarians. The Goths were now, on every side, surrounded and persecuted, for by the Roman army, and exhausted by the long siege of Philopappis, they would gladly have purchased, by the surrender of all their booty and prisoners, the permission of an undisturbed retreat. The emperor, confident of victory, refused to listen to any terms of accommodation; and the high-spirited barbarians preferred death to slavery. The two armies, therefore, prepared for an engagement. The conflict was severe; two lines of the Gothic army were thrown into disorder; and the third only remained entire, prepared to dispute the passage of a morass, which was imprudently attempted by the Roman troops. Here the fortune of the day assumed a new aspect. In this morass the Roman army, borne down by the weight of their armour, after an intellectual struggle, was irrecoverably lost; nor could the body of the emperor ever be found. Upon the election of Gallus A.D. 231, the first object of his attention was to deliver the Illyrian provinces from the intolerable weight of the victorious Goths. He offered them every inducement: in his power to withdraw their forces; and he even promised to pay them annually a large sum of gold, on condition they should never afterwards infest the Roman territories by their incursions. This tribute, however, though granted at the expense of the honour of the Romans, was insufficient to secure their permanent repose.

New swarms of barbarians, encouraged by the successes, and conceiving themselves not bound by the obligation of their brethren, spread devastation through the Illyrian provinces, and terror as far as the gates of Rome. In this period of alarm and discord, Aninius, governor of Pannonia and Moesia, rallied the scattered forces of the empire; and the barbarians were unexpectedly attacked, routed, chased, and pursued beyond the Danube. Under the reigns of Valerian and Gallienus, the frontier of the last-mentioned river was perpetually infested by the inroads of the Germans and Sarmatians; but it was defended by the Romans with more than usual firmness and success. Nevertheless, the great stream of the Gothic hordes was diverted into a very different channel. The Goths, in their new settlement of the Ukraine, soon became masters of the northern coast of the Euxine; to the south of that inland sea were situated the wealthy provinces of Asia Minor, which possessed all that could attract, and nothing that could repel, a barbarian conqueror. The little kingdom of Bosphorus, whose capital was situated on the straits, through which the Maotis communicates itself to the Euxine, was composed of degenerate Greeks, and half-civilized barbarians. In this small kingdom, domestic factions, and the fear, or interest, of obnoxious usurpers, who feigned on the vacant throne, admitted the Goths into the heart of Bosphorus.

Here they acquired a naval force sufficient to transport their troops to the coast of Asia. For this purpose, they constructed a fort of flat-bottomed boats, called "Camara," framed of timber only, without any iron, and occasionally covered with a shewing roof, on the appearance of a tempest. With this kind of fleet, they first appeared before Pityus, at the utmost limit of the Roman provinces, with a convenient port, and fortified with a strong wall. Their first attack was repulsed; but, renewing their attempts, they destroyed this city. Then circling round the eastern extremity of the Euxine sea, their navigation from Pityus to Trebifond was a course of about 350 miles. This city was large and populous, defended by a double inclosure of walls, and had its usual garrison strengthened by a reinforcement of 10,000 men. But this numerous garrison was dissolved in riot and luxury, and thus rendered careless in guarding their inexpressible fortifications. The Goths, availing themselves of the supine negligence of the besiegers, erected a lofty pile of fagaces, ascended the walls in the silence of the night, entered the defended city, sword in hand, massacred the inhabitants, destroyed the temples and splendid edifices, and gained an immense booty. With the rich spoils of the city they filled a great fleet of ships, which they found in the port, and, satisfied with the success of their first naval expedition, returned in triumph to their new establishments in the kingdom of the Bosphorus. In their second naval expedition, possessed of greater powers both of men and ships, they took a new course, followed the western coast of the Euxine, passed before the wide mouth of the Borythones, the Niter, and the Danube; and increasing their fleet by a great number of fishing boats, they approached the narrow outlet through which the Euxine sea pours its waters into the Mediterranean. In this expedition they plundered the cities of Bithynia, Chalcedon, Nice, Prum, Apamea, Cius, and Nicomedia. From the recent attack of Prum, the Goths advanced within 18 miles of Cyzicus; but their progress was stopped by the small river Rhynsacus, which issues from the lake Apollinates, and which was then swelled into a broad and rapid stream. Their retreat to the maritime city of Hercules, where their fleet was probably stationed, was attended by a long train of waggons, laden with the spoils of Bithynia, and
and was marked by the flames of Nice and Nicomedia, which they wantonly burnt. The third naval expedition of the Goths consisted of 500 sail of transports, containing about 15,000 warriors. They now steered their destructive course from the Chersonian to the Thracian Bosphorus; and were carried to the lake of the Propontis. Their landing on the little island of Cyzicus was followed by the ruin of that ancient and noble city. They then passed through the narrow passage of the Hellespont, and purged their winding navigation amidst the numerous islands scattered over the Archipelago, or Aegean sea. At length the Gothic fleet anchored in the port of Piraeus, five miles from Athens, ravaged Greece, and caused the rage of war, both by land and sea, to spread from the extremity of Samos, to the western coast of Epirus, advancing within sight of Italy. The insatiable Galliuns was routed; the emperors appeared in arms; and his presence contributed to check the despair of the enemy. Some of the numerous Gothic boat broke into Mysia, for the purpose of forcing their way up the Danube to their settlements in the Ukraine. Others returned on board their vessels, and retracing their course through the Hellespont and the Bosphorus, and finding themselves secure within the bason of the Euxine, landed at Anchialus, in Thrace, near the foot of mount Hauma, and refashioned themselves by the use of those pleasant and salutary hot-baths. Amidst their devastations, we may select the destruction of the famous temple of Diana at Ephesus, which they burnt in their third naval invasion. It is also said, that they threatened to destroy all the libraries of Athens, but were prevented from executing their menace by the profound observation of one of their chiefs, that as long as the Greeks were addicted to the study of books, they would never apply themselves to the exercise of arms. Under the reign of Claudius, A. D. 269, the Goths collected an armament more formidable than any that had yet issued from the Euxine. On the banks of the Nielder they constructed a fleet of 2000, or even of 6000 vessels, which, in their piaffage through the Bosphorus, encountered various difficulties. However, they made several defeats on the coasts, both of Europe and Asia. But discontent and division arose in the fleet, and some of their chiefs deserted them, and failed away towards Crete and Cyprus: the main body, nevertheless, pursued their course, anchored at the foot of mount Athos, and assaulted the city of Thessalonica. Their attacks were soon interrupted by the rapid approach of Claudius. The Goths, eager for a general engagement, relinquished the siege of Thessalonica; and with this view, leaving their navy at the foot of mount Athos, traversed the hills of Macedonia. Claudius was defeated, but at the same time firm and determined. The event exceeded even his own expectations, as well as those of the world; and having gained signal victories, and diverted the empire from this host of barbarians, he was distinguished by politeness under the glorious appellation of the Gothic Claudius. The decisive battle was fought near Naissus, a city of Dardania. The war was afterwards diffused over the provinces of Mysia, Thrace, and Macedonia, and the superior talents of the emperor generally enabled the successes of his arms. The Goths suffered to such a degree, that a feebler body of their youth was received among the Imperial troops, the remainder was fold into servitude, and the female captives were innumerable, that every soldier appropriated to himself two or three women. To complete the disasters of the Goths, their fleet was either taken or sunk, so that their retreat was thus intercepted. Aurelian, the successor of Claudius, distinguished himself during the Gothic war, and, at last, put an end to it by a lading and beneficial treaty. The Gothic nation engaged to supply the armies of Rome with a body of 2500 auxiliaries, consisting entirely of cavalry, and, in return, stipulated an undisturbed retreat, with a regular market as far as the Danube, provided by the emperor's care, but at their own expense. But the most important condition of peace was understood rather than expressed in the treaty. Aurelian withdrew the Roman forces from Dacia, and tacitly relinquished that great province to the Goths and Vandals. This proved, in the event: a wise measure; for, after Dacia became an independent state, it formed as the firmest barrier of the empire against the invasions of the haggers of the North.

About the year 273, the second of the reign of Probus, the Goths entered Thrace, and advanced as far as Illyricum, having wasted the country with fire and sword; but as soon as they heard that the emperor was marching against them, they retreated and left their booty behind them. In Illyricum, Probus was met by deputies from the Gothic nations, suing for peace, and submitting to his power. No further mention is made of the Goths till the year 289, at which time Diocletian is said to have gained a complete victory over them. From this victory Diocletian assumed the name of "Sarmatian," as appears from several ancient coins and inscriptions. From this year to the 15th of Constance, the Goths gave no disturbance to the empire, being engaged in wars with the neighboring nations. As soon as the Goths were disengaged from other wars, they invaded the Roman empire; but they were overcome by Constantine in several battles, fought at Campania, in Panonia, and at Margus and Bononia, in Upper Media. The emperor determined to chastise as well as to repulse the infidel barbarians who had dared to attack the territories of Rome, passed the Danube, and penetrated into the midst of the Gothic camps; and when he had inflicted a severe reverse, he condescended to give peace to the suppliant Goths, on condition that as often as they were required, they should supply his army with a body of 50,000 soldiers. In the year 331, a war broke out between the Goths and Sarmatians; on which occasion the latter had recourse to Constantine, who was glad to embrace an opportunity of humbling that ferocious nation. In the first action the barbarians gained the advantage; but the event of a second and more successful action, in April 352, retrieved the honour of the Roman name. Near 100,000 of the enemy were either put to the sword, or perished after the battle with hunger and cold; and this defeat was so signal, as to oblige Abaric, king of the Goths, to sue for peace, and to deliver hostages to the emperor, one of whom was his own son. The Goths not only continued quiet, but served the Romans with great fidelity, during the remaining part of Constantine's reign; and in the reigns of Conclusions, Julian, Trajan, and Valentinian I. But in the first of Valens, they made inroads into Thrace; and had wasted that province. The emperor purchased their retreat for a sum of money. In the following year news was brought him to Bithynia, that the Goths were again ready to break into Thrace. When Procopius revolted, and assumed the title of emperor, the Goths expelled his cause, and sent a body of troops to his assistance; but before their arrival, he was defeated and put to death. They, however, continued in the territories of the empire, committing great ravages in Thrace and Media. Valens sent a strong detachment against them, and, in their retreat being cut off, they were obliged to lay down their arms, and yield themselves prisoners. After hostilities which lasted three years from 366 to 369, the barbarians submitted, and thus appeased the resentment of Valens. After the ratification of the treaty, Valens returned in triumph to Con-
Goths.

The Goths remained in a state of tranquility about six years; till they were violently impelled against the Roman empire by an innumerable host of Scythians, who appeared to issue from the frozen regions of the North. In the year 375 the Huns invaded the territories of the Goths, and agreed among them for a general confederation, and thus they fell upon the Roman dominions. Valens listened to their supplications, and granted them protection. The liberality of the emperor, however, was accompanied with too harsh and rigorous conditions. Before they passed the Danube, they were required to deliver their arms; and it was intimated that their children should be taken from them, and dispersed through the provinces of Asia; where they might be civilized by the arts of education, and serve as hostages to secure the fidelity of their parents. A probable testimony has fixed the number of the Gothic warriors at 200,000 men; and if we can venture to add the full proportion of women, of children, and of slaves, the whole mass of people which composed this formidable emigration must have amounted to near a million of persons, of both sexes and of all ages. The Goths, fully provoked at the cruel treatment they met with from the Roman officers, who were furnished with provisions, had fiercely entered Thrace, under the conditions imposed upon them, when they began to mutiny and plunder the country. This occasioned a long and bloody war between them and the Romans. They were joined by the Huns, Alani, Taifakes, and other swarms of their countrymen. In the battle of Hadrianople, A.D. 378, the Roman cavalry fled; and the infantry was abandoned, surrounded, and cut in pieces; and though the Goths were obliged to raise the siege of Hadrianople, the tide of the Gothic inundation rolled from the walls of this city to the suburbs of Constantinople; and the Roman provinces were ravaged by the barbarians. At this time a suffusion prevailed, that the Goths of Asia had formed a secret and dangerous conspiracy against the public safety. An order was promulgated that, on a fixed day, the Gothic youth should assemble in the capital cities of their respective provinces; and as a report was industriously circulated, that they were summoned to receive a liberal gift of land and money, the pleading hope allayed the fury of their resentment, and perhaps lulled the motions of the conspiracy. On the appointed day, the unarmed crowd of the Gothic youth assembled in the square, or forum; the streets and avenues were occupied by the Roman troops; and the roofs of the houses were covered with archers and slingers. At the same time in all the cities of the East, the signal was given of indiscriminate slaughter; and the provinces of Asia were delivered by the cruel prudence of Julius, who was master-general of the troops, from a domestic enemy, who, in a few months, might have carried fire and sword from the Hellespont to the Euphrates. At length the Goths submitted to Theodosius I., and were allowed by him to settle in Thrace and Macedonia, which two provinces had been almost depopulated by the frequent incursions of the neighbouring barbarians, and the late destructive war. A numerous colony of the Vitighots was settled in Thrace; the remains of the Ofrorothots were planted in Phrygia and Lydia; their immediate wants were supplied by a distribution of corn and cattle; and their future industry was encouraged by an exemption from tribute for a certain number of years. Hopes were entertained that the manners of the barbarians would in time be civilized, and that their potterv would be indubitably blended with the body of the Roman people. Notwithstanding these flattering expectations, it was apparent to every discerning eye, that the Goths would long remain the enemies, and might soon become the conquerors of the Roman empire. As the impotent Goths could only be restrained by the firm and temperate character of Theodosius, the public safety seemed to depend on the life and abilities of a single man. He died in the month of January A.D. 395; and before the end of the winter of the same year, the Gothic nation was in arms. The interception of the harvest in the province of the Pireus, Corinth, Argos, and Sparta yielded without resistance to the arms of the Goths. From Thermopylae to Sparta, the leader of the Goths purged his victorious march, without encountering any mortal antagonists; and the Christian faith, which he had devoutly embraced, taught him to despise the imaginary deities of Rome and Athens. In 397 Stilicho, the general of the West, advanced to chastise the invaders of Greece. The skill and perseverance of the Roman at length prevailed; and the Goths, after fulfilling a considerable loss by defection and desertion, gradually retreated to the lofty mountains of Phocoe, near the sources of the Peneus, and on the frontiers of Ely; a sacred country, which had formerly been exempted from the calamities of war. Their camp was immediately besieged; and reduced to great distress by thirst and hunger. A strong line of circumvallation was formed to prevent their escape. Alaric was secret, prudent, and rapid in his operations; he immediately negotiated a treaty with the ministers of Constantine; and Stilicho was compelled to retire from the dominions of Arcadius; and he respected, in the enemy of Rome, the honourable character of the ally and servant of the emperor of the East. Alaric is declared master-general of the Eastern Illyricum; and the ufe to which he applied his new command distinguishes the firm and judicious character of his policy. He lies his orders to the four magazines of offensive and defensive arms, Margus, Ratiana, Naufius, and Thebafalia, to provide his troops with an extraordinary supply of shields, helmets, swords, and spears. With the unanimous consent of the barbarian chieftains, the master-general of Illyricum was elevated, according to ancient custom, on a shield, and solemnly proclaimed king of the Vitighots. Thus armed with double power, and feated on the verge of the two empires, he aspired to quell the two emperors Arcadius and Honorius, till he declared and executed his resolution of invading the dominions of the West. He was tempted by the fame, the beauty, and the wealth of Italy, which he had twice visited; and he secretly aspired to plant the Gothic standard on the walls of Rome, and to enrich his army with the accumulated spoils of three hundred triumphs. Alaric lyes no time in executing his purpose of invading Italy, and advances, against much opposition, towards the capital of the empire. It was in the year 400 that he first entered Italy, making dreadful ravages in his progress. His march, probably from Thebafalia, through the warlike and hostile country of Pannonia, as far as the foot of the Julian Alps; his passage of those mountains, which were strongly guarded by troops and entrenchments; the siege of Aquileia, and the conquest of the provinces of Illyria and Venetia, appear to have employed a considerable time. In the year 403, Alaric approached Milan, and the emperor Honorius, dreadimg his arrival, fled to Ravenna. Stilicho, however, prepared to march against the enemy, whom he found encamped at Pollentia, on the Tamaro, in Piedmont. While the Christian
Goths.

Christian Goths were devoutly celebrating Easter, they were attacked by Sulich, and after a very severe engagement, they retreated from the field of battle, after the total defeat of the infantry, with their cavalry entire, under the command of Alaric, who poisted a mind, that was invincible and superior to misfortune, and that derived new resources from adversity. The Gothic sovereign, wishing to distinguish his retreat by some illustrious exploit, attacked Verona, but in the battle that ensued he suffered a defeat so great as to separate him from that at Pollentia. In the year 428 Alaric marched again towards Rome; with bold and rapid marches he passed the Alps and the Po; hastily pillaged the cities of Aquitania, Alba, Concordia, and Cremona; increased his forces by the accession of 75,000 auxiliaries; and, without meeting a single enemy in the field, advanced as far as the edge of the mora, which protected the impenetrable residence of the emperor of the West. He soon after pitched his camp under the walls of Rome. A ransom having being offered and accepted, he raises the siege.

A.D. 429. Alaric's next attack was directed against the port of Ocitia, one of the boldest and most stupendous works of Roman magnificence; and as soon as he was in possession of this important place, he summoned the city to surrender at discretion; but he contented himself with superfluous Honorius, and believing the purple on Atalattus, prefect of the city. Atalattus was soon after degraded, and his degradation was followed by the third siege and sack of Rome, Aug. 24, A.D. 410. At the hour of midnight the Sabine gate was silently opened, and the inhabitants were awakened by the tremendous sound of the Gothic trumpet. Eleven hundred and sixty-three years after the foundation of Rome, the Imperial city, which had fabled and civilized for a considerable part of mankind, was delivered to the licentious fury of the tribes of Germany and Scythia. After six days' pillage and devastation, the victorious Goths evacuated Rome, and their intrepid leader advanced into Campania, and having ravaged that and the neighbouring provinces of Lucania, Samnium, Apulia, and Calabria, he approached the limits of Sicily, with a design to pass over into that island, and thence into Africa; but he was seized in the neighbourhood of Rhegium with a fit of illness, of which he died in a few days. (See ALARIC.)

He was succeeded in the Gothic throne by his brother-in-law Atalattus, or Adolphus, who concluded a peace with the empire, and marched into Gaul A.D. 452. Being driven out of Gaul A.D. 451, he retired to Spain, where he was soon after assailed. Jingeric, his successor on the Gothic throne, shared the same fate. After his death the free choice of the nation bestowed the Gothic sceptre on Valia or Wallia, who concluded a peace with the Romans, and commenced a faugumary, but successful war with the barbarians, who had settled in Spain. His victorious Goths, A.D. 459, forty-three years after they had passed the Danube, were enfeoffed, according to the faith of treaties, in the possession of the second Aquitain, a maritime province between the Garonne and the Loire, under the civil and ecclesiastical jurisdiction of Bourdeaux. The Gothic limits were afterwards enlarged by the additional grant of some neighbouring dioceses; and the successors of Alaric fixed their royal residence at Thoiloufe. Thus, about the same time, in the latter year of the reign of Honorius, the Goths, the Burgundians, and the Franks, obtained a permanent seat and dominion in the provinces of Gaul. Wallia was succeeded by Theodoric, who first made war with the Romans, and gained several places in Gaul belonging to them; and afterwards concluded a peace with them. The Goths continued quiet in the countries that had been allotted them in Gaul for the space of ten years, or till the year 456, when, the Romans being engaged in a war with the Burgundians, Theodoric availed himself of that opportunity to enlarge his dominions. At length the Gothic king made peace with the Romans; and in the year 453 engaged by an alliance with them to affiit them against the Huns, who had entered Gaul. Theodoric, his son and successor, breaks with the Romans; but his brother Theodore, who next occupied the Gothic throne, and who was eminently distinguished by his talents and attainments, cultivated the friendship of the Romans, and contributed by his martial exploits to the support of the Roman empire. Theodoric entered Spain with a large army of Goths and Burgundians; and having almost reduced the Suevians in Galicia, A.D. 457, he passed from thence into Lusitania, and reduced several places. Upon his return to Gaul, he took several cities belonging to the Romans, but was at length checked in his career and defeated by Agisidius, commander in chief of the Roman forces in that country.

In Spain the Goths were more successful than they were in Gaul, and became masters of the greater part of the country. Under Euric, who ascended the throne A.D. 466, the Goths drove the Romans out of Spain; and all the provinces, except Galicia, and part of Lusitania, which were subject to the Suevians, acknowledged him as their king, who residing at Thoulofs, governed them by his lieutenants. Euric, having also made himself master of the breadth of Gaul, comprising the whole tract between the Rhone and the Loire, and of the greatest part of Spain, was full of designs of reducing the remaining parts of both countries, when his death at Arles, A.D. 483, put a stop to his great designs. Euric is said to have been the first who gave written laws to the Goths, for till his reign they had been governed by customs only; and for this purpose he employed Leo, his prime minister, one of the most learned men, and best citizens of that period. These laws were called the "Theodorian" laws; and were obtruded by Euric upon the people of Gaul and Spain, who had been long accustomed to the Roman laws; but Alaric, his son and successor, restored the Roman laws to their former authority, and caused them to be observed throughout his dominions. About this period the king of the Vifgoths in Gaul terminated; and they, being driven from thence, fixed their royal seat at Toledo, in Spain. (See VISIGOTHS.) For the history of the Ostrogoths, see OSTROGOTHS. Under Theodoric, who, A.D. 493, caused himself to be proclaimed by his Gothic king of Italy, and was acknowledged as such by the emperor Anastasius, the successor of Zeno, Theodoric secured his new kingdom by alliances with neighbouring powers: he quarreled all his Goths in the cities and strong holds, with their officers who were to command them in time of war, and govern them in time of peace; he retained the Roman laws, the same form of government, the same distribution of provinces, the same magistrates and dignities; and, besides, according to the custom of the Goths, he appointed for each city inferior judges, distinguished by the title of counts, who were to administer justice, and decide all disputes; and in this respect he followed the policy of the Goths, as Goths observes, far excelled that of the Romans. Thus Italy, from the dominion of the Romans, fell under that of the Goths, almost without any perceptible change. See THEODORIC.

At subsequent periods attempts were made to recover the country from subjection to their government; particularly in the reign of Jutamin. Under the weak reign of Theodatas, the Gothic king of Italy, Belisarius invaded Italy, entered Rome A.D. 536, and reduced Naples A.D. 537. He defended Rome against the whole army of the Goths.
Goths, who besieged it A.D. 537, and continued it above a year till their final departure. During this siege, which was raised in March, A.D. 538, one-third of their enormous host was destroyed in frequent and bloody combats under the walls of the city, and the evils of famine and pestilence were aggravated by their own licentiousness, and the unfriendly disposition of the country. Vitiges, their king, retired for shelter within the walls and moraines of Ravenna. At length Belisarius besieged the city, and took it in the latter end of the year 539. The feoffation of the capital was imitated in the towns and villages of Italy; and the independent Goths who remained in arms at Pavia and Verona, were ambitious only to become the subjects of Belisarius. But his inflexible loyalty rejected, except as the substitute of Justinian, their oath of allegiance. In the year 540, the Goths revolted, and Totila, the nephew of their late king, undertook the restitution of the kingdom of Italy. His first movements were rapid and successful; and after reducing by force, or treaty, the towns of inferior note in the midland provinces of Italy, Totila proceeded, A.D. 546, to encompass Rome, and to harry its inhabitants. Famine had relaxed the strength and discipline of the garrison, and Rome was taken by the Goths in December, A.D. 546. After the departure of Totila, it was recovered by Belisarius in February, A.D. 547. (See Belisarius.) When Totila returned to avenge the injury and disgrace, the Goths were three repulsed; they lost the flower of their troops; the royal standard had almost fallen into the hands of the enemy, and the fame of Totila funk, as it had fallen, with the fortune of his arms. Rome was again taken by the Goths, A.D. 549. Justinian made great preparations for the Gothic war, the conduct of which was committed to Narses, who defeated Totila in a bloody engagement, July, A.D. 552, and Totila himself was struck through the body with a lance. Narses then proceeded to the conquest of Rome; and Justinian once more received the keys of the imperial city, which, under his reign, had been five times taken and recovered. The last king of the Goths was Teias, who was unanimously chosen to succeed and revenge their departed hero, March, A.D. 553: Sixty days were consumed in diffuse and fruitless combats, between the Gothic and Roman armies, but at length, after an engagement of many hours, Teias fell, and his head, exalted on a spear, proclaimed to the nations, that the Gothic kingdom was no more. After a reign of 50 years, the throne of the Gothic kings was filled by the exarch of Ravenna (see Exarch); and the remains of the Gothic nation evacuated the country or mingled with the people. (Anc. Un. Hist. vol. xiv. Gibbon's Hist. vol. vii. par. 13.)

The Goths spread themselves very widely in their various migrations, and formed part of the population of the several nations of Europe. In England the Celtic population was succeeded by the Gothic, and about two-thirds of England were peopled by the Belgic Goths. (See Belgae and England.) About the time that the Belgae feigned on the south of England, it appears that a hundred Gothic tribes passed to the south of Ireland. (See Ireland.) In France, or Gaul, the Goths, or warlike German tribes, under the denomination of Belgae, feigned on a third part of the country into which they introduced the Gothic language and manners. (See Belgae and Gaul.) The original population of the Netherlands was Celtic; but it was afterwards peopled by the Belgae. (See Belgae and Netherlands.) In Germany, the Scythians or Goths, proceeding either from Scandinavia, or, as others say, from their original seats on the Euxine, expelled the Cimbri and Jines, and thence, intermixed with the German nations, destroyed the Roman empire in the west. (See Germany, and the preceding part of this article.) Prussia appears to have been peopled by the Pechini and Jellis, Gothic tribes bordering on the Venedi, who were Slavonians. (See Prussia.) The Vandals, who conquered Spain in the fifth century, were subdued by the Visigoths under Euric, who founded the modern kingdom of Spain. (See Spain.) The original population of Turkey in Europe chiefly sprung from the ancient Scythians on the Euxine, the progenitors of the Dacians, Thracians, &c. and even of the Greeks. The regions of Turkey in Asia were peopled by Scythic nations, intermixed with a few Assyrians from the south. (See Turkey.) The Batavi of Holland were the most northern people of Belgic Gaul, and without doubt a German or Gothic people. (See Batavi, Gaul, and England.) The Cimbri or northern Celts, who originally peopled Denmark, were expelled by the Goths, if they were not, as some conceive, tribes of the same name; and the Fins or Laps of Norway, which, with Sweden, constitutes the ancient Scandinavia, were driven to the northern extremities by the Gothic invasion. (See Denmark, Norway, Scandinavia, and Sweden.) The Helvetians, or original Swifts, are supposed by some writers to have been Celts; but others, with greater probability, consider them as a Gothic race, or very ancient colony of Germans.

It has been a general opinion, tenaciously maintained by Cluverius and Pelloutier, and adopted by Mallet in his "Northern Antiquities," that the Gothic and Celtic nations were the same; but the ingenious English translator of Mr. Mallet's "Northern Antiquities" has produced a variety of testimonies from ancient authors, to prove that the Celtic and Teutonic or Gothic nations were, ab origine, distinct, and that they differed considerably in person, manners, laws, religion, and language. The former were the ancestors of the Britons of Gaul, Britons of Britain, Saxons, and Scandinavians derived their origin from the latter. The Celtic tribes were probably the first that travelled westward; and the Goths, or Getz of the ancients, who emigrated at different times from the eastern countries after them, might borrow some of their opinions and practices, which will account for the resemblance that has been observed between them, without admitting that they were descents from them, or that they should be considered as the same people. In the same way we may account for those relics both of Celtic and Gothic superstitions, which are discernible in Gaul and Britain, and many other countries, the inhabitants of which derive their descent equally from the Celts and Goths, who were at different times mailers of thefe kingdoms, and whose descendants are now blended together; thus, the first inhabitants of Gaul and Britain being of Celtic race, followed the Druidical superstition. The ancient Germans, Scandinavians, &c. being of Gothic race, professed that heaven of polytheism which was afterwards delivered in the Edda; and the Franks and Saxons, who afterwards settled in Gaul and Britain, being of Gothic race, introduced the polytheism of their own nation, which was in general the fame that prevailed among all the other Gothic or Teutonic people. See, however, the article Gothic language, where the original identity of the Celts and Goths is maintained partly by general reasoning, and partly by etymological investigation.

GOTLUNDA, in Geography, a town of Sweden, in Nericy; nine miles N. E. of Orebro.

GOTOMB, a town of Poland, in the palatinate of Lublins; 29 miles N. W. of Lublin.

GO-TON, a town of China, in the province of Se-tchuen; 48 miles N.W. of Ou-mung.
GOTSEELA, a town of Bengal; 48 miles W. of Midnapour.

GOTTA, or Gotto Island, a cluster of small Japanese islands. N. lat. 30° 40'. E. long. 131° 40'.

GOTTALU, a town of Bengal; 33 miles S. of Burdwan. N. lat. 22° 42'. E. long. 88° 5'.

GOTTESBERG, a town of Silesia, in the principality of Schweinitz, near which are two mines, one of gold, not now worked, and another of coal. The manufacture of this town consists of knit worsted stockings. It contains two churches; 12 miles S. W. of Schweinitz. N. lat. 50° 35'. E. long. 15° 54'.

GOTTESGRAB, a town of Bohemia, in the circle of Saaz. N. lat. 30° 22'. E. long. 12° 54'.

GOTHE, Vincent Lewy, in Biographie, was born at Bologa, in the year 1642. At sixteen years of age he embraced the ecclesiastical life among the Dominican monks, and when he had completed his course of philosophy at Bologa, he was sent to study theology for four years at Salamanca in Spain. Upon his return to Italy in 1688, he was appointed professor of philosophy in the university of Bologna; and soon recommended himself by his talents and virtues to the poits of prior and provincial of his order. In 1728, pope Benedict XIII. raised him to the dignity of the purple; and three years afterwards appointed him member of the congregation for examining bishops. So highly was he esteemed, that in the last conclave, which was held during his time, he had the suffrages of a great number of the college for his being raised to the papal throne. He died at Rome in 1742, in his 79th year. His works, which are much valued by the Catholics, particularly by those in Italy, display considerable erudition and abilities. Of these the principal are "De vera Christi Ecclesia," in three volumes; "Theologia Scholastico-dogmatica, juxta Methem divi Thomae Aquinatis, &c." in six volumes 4to.; "Colloquii Theologi-Politici, in tres clavis distribuit, &c." in 12 volumes. He was employed at the time of his death in writing "A Commentary on the book of Genesis." Moreri.

GOTTIGNIES, Giles-Francois, was born at Brusseis in the year 1639, and entered into the order of the Jesuits at Mechlin in 1653, whence he was sent to Rome, to pursue his theological studies; here he spent the rest of his life employed in teaching the mathematics, and writing different works in that science. He died in 1689, when he was about sixty years of age. He was a considerable mathematician; a great lover of pure geometry, and had a dexterity in the algebraic method of resolving problems; his works are very numerous, and have been highly commended for the perspicuity and precision. They relate to arithmetic and geometry; and to the various parts of astronomy, and other branches of speculative and practical mathematics. Moreri.

GOTTINGEN, or Goettingen, in Geographie, a town of the kingdom of Welfphalia, and principal place of a district, named from it, is situated in a spacious, pleasant, fertile valley, on a canal, branching from the river Leine, and dividing the town into the New town and March. The number of houses is about 1500, containing about 8000 persons; the streets are large and paved; it has five parish churches, and one for Calvinists; the Roman Catholics perform their religious service in a private house. The town is governed by a provost, named by the sovereign, burgomasters, and a syndic chosen by the regency, appointed by a council. The university of Göttingen claims peculiar notice; it was founded in 1734 by George II, king of England, and consecrated on the 17th of September 1737, and by the attention of its first curator, baron Menchehusen, it has since to distinguished reputation. It has a splendid church, with its own pastor; and it is accommodated with a flately edifice of stone, the ground-floor of which serves as a hall for public lectures, and the upper apartments are appropriated to the library, council-chamber, and other necessary purposes. Its library is very large and valuable, and it is called the "Bulowean," from a collection of about 10,000 volumes, with which it originated, bequeathed by baron Bulow for public use, and granted by his heirs to the university. A royal society of sciences, founded in 1751, and a royal German society, form part of the university. It has likewise a fine observatory, erected on a tower on the ramparts, with a phyic garden, anatomical theatre, &c. The territory belonging to the town is very considerable; 22 miles N. E. of Callic. N. lat. 51° 47'. E. long. 9° 52'.

GOTTO, a country, in Africa, situated to the south of Jimbali and Trombeto, and the rivier Niger or Joliba, about 15° N. lat., and from o to 2° E. long. It was formerly divided into several petty states, under their own chiefs, but it is now under the government of a king. Its chief town is called Moooffedawo, from the name of their first monarch.

GOTTOLENGO, a town of Italy, in the department of the Mela; 15 miles S. of Brescia.

GOTTORP. See Schlwig.

GOTTSCHHE, a town of Middle Carniola; 20 miles S.S.E. of Laybach. N. lat. 45° 53'. E. long. 14° 48'.

GOTZEL, a town of Bavaria; 36 miles E. of Rathbon.

GOVAN, a town of Scotland, in Lasarkhire; the population of which, in 1801, was 6070, of which 1314 were employed in trade and manufactures; four miles W. of Glasgow.

GOVANDORE, a bay on the coast of Chili.

GOUANA, in Botany, was named by Jacquin in honour of Anthony Gouna, a physician and celebrated botanist of Montpellier, where he was also medical chaplain, and, as far as we know, is still living, though at a very advanced age. He was the friend and correspondent of Linnaeus, and is the author of a Flora Montpeliensia, arranged according to what he himself calls a hybrid system, the outlines being on the principles of Tournefort, the subordinate sections taken from the Linnaean sexual system. This work appeared in 1765. He had previously, in 1762, published a Hortus Montpelienfis according to the last-mentioned system. Each work forms an octavo volume. They are chiefly remarkable for the secondary generic characters, taken from the habit, subjoined to the essential ones which are founded on the fruitification. Professor Gouna published also a folio volume of Observations Botaniques, with plates, illustrative of the plants of his neighbourhood; as well as a quarto volume in Latin and French on the methodical arrangement, and generic characters at length, of filices.—Jacqu. Amer. 263. Liv. Gen. 547. Schreb. 33. Mart. Mill. Dict. v. 2. Jaff. 581. Linn. Illustr. t. 854.—Chais and order, Polygonum Monnaea, or rather Pensusa Monogyna, Nat. Ord. Duftp. Linn. Rhanni, Jull.

Gen. Ch. Cal. Perianthi of one leaf, superior, funnel-shaped, five-leaf; tube permanent; segments of the limb ovate, acute, spreading, deciduous. Cor. Petals five, opposite to the stamens, hood-shaped, chalice. Stam. Filaments five, awl-shaped, the length of the segments of the calyx, and alternate with them, inserted into the tube; anthers roundish, incumbent, sheltered by the petals. Fil. German inferior, roundish; style awl-shaped, divided half-way down
GOU

Down into three segments; stigmas obtuse. *Peric.* Capsule with three angles, separable into three parts, of one cell each, not bursting. *Seeds* solitary, ovate, compressed, polished.—There are some male flowers, furnished with a style, but without of stigmas and stigma.


Jacquin originally described two species, of which Linnaeus adopted but one. Lamarck has added three more, all in our post-filion, to which we are enabled to furnish three non-descript species, making eight in all.


2. *G. tenentofa.* Jacq. Amer. 263. Linii MSS. in Sp. Pl. (G. crenata; Lamarck Dict. v. 3, 5.)—Leaves ovate, crenated, downy.—Native of woods in Hispaniola, climbing to the tops of lofty trees. Jacquin. Of this we have seen no specimen. Jacquin says the leaves are four inches long. *Seeds* black and shining. Lamarck supposes his plant to be the same on account of the great size of its leaves, and he says it is distinguished from all others by its crenatures. Jacquin describes it as lightly crenate.

3. *G. vescerocarp.*—Leaves elliptic-oblong, pointed, oblongely ferrured, roughish, naked on both sides. Wings of the fruit narrow, orbicular.—Native, we believe, of the West Indies. The very young *flowers* and *leaves* only are fylim and furrugineous. The full-grown leaves are near three inches long and one broad. The fimbriate ovate, ferrured entire, or furnished with fllfudant ferratures, and a fllfudant entire blunt point; they are green and quite naked on both sides, but hard to the touch on the upper surface. Veins diffuse. *Flowers* fimbriate, *stipulas* hairy. *Flowers* somewhat fllfudant. *Fruits* orbicular at each side, each wing forming a hemisphere, and not being much dilated.

4. *G. denticula.*—Leaves ovate, pale and downy beneath, entire, with a finely toothed point.—Gathered by the late Mr. Christopher Smith in the island of Honinoma, East Indies.—The *leaves* are about an inch and half long, with fimbriate veins, connected by numerous minute reticulations, and are remarkable for the numerous little sharp teeth which border their upper part and terminal point, while the rest of their margin is entire. Their upper fide is roughish to the touch, but green and naked; while the lower is hoary with very dense short down, the veins only being naked. *Stipulas* small and deciduous. A fimple curved tendril terminates each lateral branch, as in all the foregoing. *Flowers* in axillary downy clusters, with lanceolate deciduous bracteas. The fruit we have not fended.

5. *G. murriana* Lam. Lamarck Dict. v. 3, 5.—Leaves ovate, pointed, variously ferrured, downy on both sides.—Native of the heights called the Goli, in the desert, of the Isle de Bourbon, where it was gathered by Commeron, and sent to the botanical garden at Paris. The *leaves* are the size of the leaf, but green and clothed with fllfudant down on both sides. Their figure is ovate, rarely somewhat cordate, often unequal, sharp-pointed, their margin singularly variable, being sometimes nearly entire, having only furred shallow ferratures, sometimes very deeply and doubly ferrated, not unlike the Roman nettle, *Urtica pilafisfera.* *Stipulas* ovate, acute, clothed with shining reddish fllfudant hairs, as well as the young twigs and tendrils. The frutification is wanting in our specimens. Lamarck says the *capsules* have rounded thin and membranous wings.

6. *G. tllifolius.* Lamarck Dict. v. 3, 5. (G. Stedmanni; Willem. Herb. Maurit. 58.)—Leaves heart-shaped, bluntly pointed, smooth on both sides, bluntly and fllfudant ferrured. Native of the Isle de Bourbon, near la Villette. *Flowers* much branched and divided, smooth, except the very young florets. *Leaves* an inch or inch and half long, and nearly as broad, heart-shaped, with shallow ferratures and a short blunt point. They are light green and naked on both sides, smooth above; minutely chaffed beneath. *Stipulas* glandular. *Flowers* fally fllfudant and downy. The *tendrils* become very thick and strong by age.

7. *G. integrifolia.* Lamarck Dict. v. 3, 5.—Leaves ovate, bluntish, entire, smooth on both sides. *Stipulas* awl-shaped. Long cultivated in the Paris garden, but its native country is not remembered. We have a specimen from thence, definite of *flowers* and fruts, yet we readily agree with Lamarck that there can be no doubt respecting its genus. The habit, *fem* and *tendrils,* folded young leaves, and their pale parallel veins, all indicate *Gerania,* for no genus can be more natural than this. The *leaves* are usually about an inch long, exactly ovate, (not oval) without any elongated point, though tipped with a gland; their margin quite entire, their midribs sometimes fllfudant hairy at the back. *Stipulas* awl-shaped, deciduous. *Flowers* hairy only while young.

8. *G. miliaena.*—Leaves heart-shaped, minutely ferrured, acute, somewhat hairy. *Stipulas* awl-shaped. *Flowers* umbellated, scarcely so long as the leaves. Brought by the late Sir G. L. Staunton, Birt, we believe from the Bahamas. The zig-zag branches, with small heart-shaped *leaves,* and numerous axillary umbels of *flowers,* give it the aspect of a *Smilax.* The *tendrils* grow from the first joint of each branch, and are elegantly spiral; fally and hairy, like the *flowery-flakes* and *callys.* The principal *leaves* are usually about an inch long, green on both sides, their ribs and veins always very hairy, their surface more or less so. *Stipulas* awl-shaped, hairy.

GOUAREC, in *Geography,* a town of France, in the department of the North Coasts, and chief place of a canton, in the district of Loudené, 124 miles S.W. of St. Brieuc. The place contains 678, and the canton 6,693 inhabitants, on a territory of 2073 kilometres, in 5 communes.

GOUD, or Gaul. See Wulp.

Gouda, or Ter Gouw, in Geography, a city of Holland, seated on a branch of the Rhine, called *Isel,* where it receives the *Gouw,* from which it derives its name. The great church of this town is one of the largest and handsomest in the country, and is particularly famous for its painted glass windows, which were executed principally by Theodore and Walter Ceraebach of this town, and which are carefully preserved. The town is advantageously situated, on account of the fllfudant and canals, which are running streams, and its convenient port, the *Isel.* It has five gates, and is so circumfanced by reeds for the *fllfudants,* which may inundate the adjacent country, the breadth and depth of its fllfudants,
and the strong fortifications on the banks of the Ijssel, that it cannot easily be besieged. Its chief trade consists in cordage, cheese, and tobacco-pipes; and it has a regular communication by boats with Amsterdam, the Hague, Rotterdam, Utrecht, &c.; 22 miles S. of Amsterdam. N. lat. 52° 1'. E. long. 4° 36'.

GOUDHURST, a port-town of England, in the county of Kent, containing 1782 inhabitants; 11 miles S. of Maidstone, and 44 S.E. of London.

GOUDOZ, a town of Atilic Turkey, in Natolia; 72 miles E.N.E. of Kütajta.

GOUDIMEL, Claude, in Biography, one of the early and most celebrated composers of music to the metrical French translations of the psalms for the use of the Calvinists. He was a native of Franche-Comté, who seems to have loft his life at Lyons, on the day of the massacre of Paris, for having fet down, in the psalms of Clement Marot. Goudimel has been much celebrated by the Calvinists in France for this music, which was never used in the church of Geneva, and by the Catholics in Italy for instructing Palestrina in the art of composition, though it is doubtful whether this great harmonist and Goudimel had ever the least acquaintance or intercourse together. He set the "Chansons Spirituelles" of the celebrated Marc-Ant. De Muret, in four parts, which were printed at Paris, 1555. We may suppose Goudimel, at this time, to have been a Catholic, as the learned Muret is never ranked among heretics by French biographers. Ten years after, when he set the psalms of Clement Marot, this version was still regarded with less horror by the Catholics than in later times; for the music which Goudimel had set to it was printed at Paris by Adrian Le Roy, and Robert Ballard, with a privilege, 1565. It was reprinted in Holland, in 1607, for the use of the Calvinists, but seems to have been too difficult; for we are told by the editor of the psalms of Claude le Jeune, which were printed at Leyden, 1633, and dedicated to the States-General, that in publishing the psalms in parts, he had preferred the music of Claude le Jeune to that of Goudimel; for as the counterpoint was simply note for note, the most ignorant in music, if possessed of a voice, and acquainted with the psalm-tune, might join in the performance of any one of them; which is impracticable in the compositions of Goudimel, many of whose psalms being composed in fugue, can only be performed by persons well skilled in music.

The works of Goudimel, who was certainly the greatest musician in France, during the reign of Charles IX., are become so scarce, that his name and reputation are preferred by Protestant historians, more in pity of his misfortunes, than by any knowledge of their excellence. With respect to his having been the master of Palestrina, that point will be discussed elsewhere.

The earliest mention of Goudimel, as a composer, that we have been able to discover, is in a work entitled "Libro quatuor Ecclesiasticarum Cantionum quatuor vocum vulgo Motet' vacant," printed at Antwerp, by Sufato, 1554, eighteen years before his death. On fearing several of these motets, we found the harmony pure and correct, but constructed entirely on the principles of the ecclesiastical tones; probably before he became a disciple of Calvin. The title of all his compositions may be seen in Draudius, Bibl. Class. and Bibl. Exot. (See Franc, Claude le Jeune, and Palestrina.) The motets of Goudimel, in four parts, resemble in gravity of style, simplicity in the subjects of fugue, and purity of harmony, the ecclesiastical compositions of our venerable countryman Bird.

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GOODSWAARTE, in Geography, a small island at the mouth of the Meuse, S. of the island of Putzer.

GOUEGA, a town of Africa, in Whidah; 10 miles W.S.W. of Sabi.

GOVENDING, a town of Bengal; 32 miles E. of Calcutta.

GOVERDAN, a town of Hindooftan, in Mewat; 10 miles E.S.E. of Digm.—Also, a town in Ouda, near the De- wah; 20 miles N. of Azimgur.

GOVERDUNPOUR, a town of Hindooftan; 44 miles N. of Allahabad.

GOVERNDUNGURRY, a town of Hindooftan, in Canara; 14 miles S.E. of Onore.

GOVERNMENT, a quality or office which gives a man power or right to command or rule over a place, a city, a province, a kingdom, or the like, either supremely or by deputation.

Government is either general and supreme, as that of a whole kingdom, empire, sovereign state, &c. or particular and subordinate, which, again, is subdivided into civil, military, and ecclesiastical.

Our cities, corporations, and boroughs, are usually governed by mayors, with aldermen and common-councillors.

Government is also used for the country, city, or place to which the power of governing or commanding is extended.

Government, again, is used for the manner or form of governing, i.e. for the police of a country, state, &c.

In this sense the various forms of government have generally received their denominations from the number of persons to whom the supreme power has been entrusted. If it be in one person, it is called a monarchy, especially if the chief magistrate lies under considerable restrictions, or governs by fixed and established laws; whereas, if this single person lies under fewer restraints, or directs everything by his own will and caprice, the government is called despotic. If the supreme power be lodged in a limited number of persons, the government is called oligarchy, or aristocracy; and if all the citizens have an equal vote in making laws, and appointing magistrates, or the supreme power is lodged in the whole body of the people, it is called a democracy or republic. See these several articles.

Civil government and society originate in the wants and fears of individuals, who, being naturally free, equal, and independent, associate together, either by express or tacit consent, for the mutual preservation of their lives, liberties, and estates, on this fundamental principle, that the whole should protect all its parts, and that every part should pay obedience to the will of the whole. However the several forms of government, that now exist, actually begun, there is and must be in all of them a supreme, irresistible, absolute, unconstrained authority, in which the jura summi imperii, or the rights of sovereignty, reside; and this authority is placed in those hands, wherein, according to the opinion of the founders of such respective states, either expressly given, or collected from their tacit approbation, the qualities requisite for supremacy, viz. wisdom, goodness, and power, are the most likely to be found.

Individuals unite for mutual protection and benefit; and, therefore, the legislative and executive authority of government, originally derived from themselves, should be invariably directed to no other end but their safety and welfare; and that form of government is most eligible, which is best adapted to these purposes. Cicero declares himself of opinion, in his fragments De Rep. lib. ii. « elle optimum condit.
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Ritusam rempublicam, que ex tribus generibus illis, regular, optimo et populari, fit modice condita. Of this kind is the British constitution, which lodges the executive power of the laws in a single person, and the legislative in three distinct powers, entirely independent of each other; viz. the king; the lords spiritual and temporal, forming an arithocratical assembly; and the house of commons, freely chosen by the people, which renders it a kind of democracy; and each branch of this aggregate body, actuated by different views, and attentive to different interests, is armed with a negative power, sufficient to repel any innovation which it shall think inexpedient or dangerous. Nothing can endanger or hurt the constitutional government of Britain, but destroying the equilibrium of power between one branch of the legislature and the rest: for if ever it should happen that the independence of any one of the three should be lost, or that it should become subservient to the views of the other two, there would soon be an end of our constitution: the legislature would be changed from that which was originally set up by the general consent and fundamental act of the society; and such a change, however effected, is, according to Mr. Locke, at once an entire dissolution of the bands of government, and the people are thereby reduced to a state of anarchy, with liberty to constitute to themselves a new legislative power. Locke on Government, book ii. chap. 19. Blackill. Com. vol. i. Introd.

Another excellent writer gives a different account of the origin of civil government from that which has been above stated. Accordingly, he observes, that government, at first, was either patriarchal or military; that of a parent over his family, or of a commander over his fellow-warriors. Paternal authority, and the order of domestic life, says Dr. Paley, (Moral Philosophy, vol. ii.) supplied the foundation of civil government. The condition of human infancy prepares men for society, by combining individuals into small communities, and by placing them from the beginning under direction and control. A family contains the rudiments of an empire. The authority of one over many, and the disposition to govern and to be governed, are in this way incidental to the very nature, and consoled, no doubt, with the existence of the human species. Besides, a parent would retain a considerable part of his authority after his children were grown up, and had formed families of their own. This is the second stage in the progress of dominion. The first was that of a parent over his young children; this that of an ancestor preying over his adult descendants. The association, thus formed, would naturally be continued after the death of the original progenitor; and the members of it, accustomed to the benefits resulting from it, might be induced to supply his place by a formal choice of a successor, or they might voluntarily, and almost imperceptibly, transfer their obedience to one of the family, which had claimed their respect and confidence; or, again, they might receive with due deference a successor, appointed by the first ancestor. Thus we have a tribe or clan, incorporated under one chief, and fulfilling the purposes of civil union, without any other or more regular convention, constitution, or form of government than what has now been described. Two or three of these clans would frequently, by marriage, conquest, mutual defence, common dislike, or some other accidental circumstances, be united into a society of larger extent. Another source of personal authority, which might extend, or supersede, the patriarchal, is that which results from military arrangement. A popular and successful leader, in every action of aggression or defence, would gain a powerful and permanent influence among his followers. This advan-
tage, added to the authority of the patriarchal chief, or favoured by any previous distinction of ancestry, would enable the person who possessed it to acquire the almost absolute direction of the affairs of the community; more especially if he took care to associate to himself principal auxiliaries, and to gratify or remove those who opposed his pretensions.

The causes which have contributed to introduce hereditary dominion, are principally the influence of association, which communicates to the son a portion of the respect that was paid to the virtues or flattery of the father, the mutual jealousy of other competitors, the greater envy with which all behold the exaltation of an equal, than the continuance of an acknowledged superiority, and the number of adherents left by a reigning prince, who prefers their own importance, merely by supporting the succession of his children, and the apprehension of calamities that are incidental to contested elections. The ancient state of society in most countries, says our author, and the modern condition of some uncivilized parts of the world, exhibit that appearance, which this account of the original of civil government would lead us to expect. The earliest histories of Palestine, Greece, Italy, Gaul, and Britain, inform us that those countries were occupied by many small independent nations, resembling those which are now found among the savage inhabitants of North America, and upon the coast of Africa. This theory, it is added, affords a presumption, that the earliest governments were monarchies, because the government of families, and of armies, from which, according to the preceding statement, civil government derived its institution, and probably its form, is universally monarchical.

Our readers will observe that this theory is very different from that of Robert Filmer's patriarchal scheme, now, indeed, almost forgotten and scarcely deserving to be recorded; the refutation of which constitutes the first part of the admirable Treatise on Government. According to this scheme, all government is absolute monarchy, which the author founds on this previous principle, that no man is born free. The absolute sovereignty of Adam was the result of a divine appointment and donation, and this sovereignty has been regularly conveyed by a divine hereditary right to all succeeding monarchs. The notion, that kings reign by a divine right, independently of the designation of the people, and not accountable to them for the exercise of their power, absurd as it will now very generally be thought, was, however, for a long time not only admitted, but prevalent even in this country. It is strongly inculcated in the Homilies of our established church, and was strenuously maintained by several of its respectable divines. Dr. Tillotson, enlightened and excellent as he was in other respects, could not, in the middle part of his life, emancipate himself from the idea, that it was sinful to revolt government, as is evident from his letter to Lord Rufford. That power originates with the people was condemned as an abominable tenet by the famous Oxford decree of 1683; but this is a topic on which it is needless to enlarge.

In the most popular forms of government, says Dr. Paley, the physical strength resides in the governed; and it therefore becomes an inquiry of considerable importance, among politicians, what motives induce the many to submit to the few. In the discussion of this question our author distinguishes the subjects of a state into three different classes, viz. 1. Those who obey from prejudice, or who are determined by an opinion of right in their governors, which opinion is founded upon prescription; this preceptive title, in hereditary monarchies, is corroborated, and its influence considerably augmented, by an accession of religious sentiments, and by that force which Dr. Paley calls the social virtue. 2. Those who obey from respect for the power, in the national sense, of the commune: a power which supports the government, in the present age of society, with an additional strength, is the influence of civil opinion, or the judicious administration of the administration. 3. Those who obey from respect for the integrity of the persons, who are esteemed the agents of the government. This is the principle of a sort of domestic government. The subject-matter of this inquiry is treated at length in the last volume of Paley's Moral and Political Philosophy.
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That which men are apt to ascribe to the perfons of princes. 2. Those who obey from reafon, by a cenferation of the neceffity of some government or other, and of the certain mischief of civil commotions. 3. Those who obey from felf-interest, and who are kept in order by a variety of confequences that immediately affect themfelves.

Concerning the moral obligation of fubmiffion to civil government, thofe who adopt the principles of Mr. Locke, and many other political writers, allege a compact between the citizen and the state, as the ground of the relation between them; and this compact binding the parties, like private contracts, refolves the duty of fubmiffion into the universal obligation of fidelity in the performance of promises. This compact is either, 1. Exprefs, on the part of the primitive founders of the state, who are fuppofed to have met together for the declared purpofe of fetting the terms of their political union, and a future confitution of government. The whole body is fuppofed to have unanimously confefted to be bound by the refolutions of the majority; and that majority is fuppofed to have fixed certain fundamental regulations, and thus to have confifted, either in one perfon, or in an asfembly, a flanding legiflature, to which, under thefe pre-éstablifhed reftrictions, the government of the state was thenceforward committed, and whose laws the feveral members of the convention were, by their firft undertaking, thus perfonally engaged to obey.—This tranfaction is fometimes called the "Social compact," and these fuppofed original regulations compofe what are meant by the "confitution," the "fundamental laws of the confitution;" and form, on one fide, the "inherent indefeafible prerogative of the crown;" and, on the other, the unalienable "birth-right" of the subject: i.e. a tacit or implied compact by all fucceeding members of the state, who, by accepting its protection, confeft to be bound by its laws. "This account of the fubject," fays Dr. Paley, "although fpecious, and patronized by names the moft respectable, appears to labour under the following objections; that it is founded upon a fuppofition fake in fact; and leading to dangerous confquences." No fuch focial compact was ever really made, nor any fuch original convention of the people ever actually held, or could be held in any country, antecedent to the eftablitement of civil government in that country. It is to fuppofe it poifible to call favages out of caves and defarts, to deliberate and vote upon topics, which the experience, and studies, and refinements of civil life, alone fuggrefs; therefore no government in the univerfe began from this original. At a Revolution fome imitation of a focial compact may have taken place. The eftabliment of the United States of North America bears the neareft refeemblance of it. Should it be faid, that the original compact is not propofed as a fact, but as a fiction, for the commodious explication of the mutual rights and duties of Sovereigns and Subjects; to this representa- tion it may be replied, that the original compact, if it be not a fact, is nothing; it can confer no actual authority upon laws or magiftrates, nor afford any foundation to rights, which are fuppofed to be real and exifling. But in the books, and ali in the apprehenfion of thofe who deduce our civil rights and obligations à patria, the original convention is appoited to, and treated of, as a reality.

Moreover, it is alleged, that the theory of government, which affirms the exiflence and the obligation of a focial compact, leads to conclusions unfavourable to the improvement, and to the peace, of human fociety. Upon this theory it may be premifed that many points, called "fundamentals" of the confitution, were fet down by a convention of the people, anterior to the eftabliment of the fuflifing

legifature, and which the legislature has no right to alter, or interfere with. This circumstance affords a dangerous pre- frence for disputing the authority of the laws. Hence arose the doubt, which to much agitated the minds of men in the reign of Charles II., whether an act of parliament could of right alter or limit the fucceflion of the crown. Besides, if it be by virtue of a compact that the subject owes obedience to civil government, he ought to abide by the power of government which he finds eftablifhed, however abfur or inconvenient it may be. Moreover, every violation of the compact on the part of the governor relieves the subject from his allegiance, and difolves the government.

Dr. Paley, rejecting the intervention of a compact, as unfounded in its principle, and dangerous in the application, aligns for the only ground of the fubject's obligation, "the will of God as collected from expediency." Accordingly the author reasons in the following manner. It is the will of God that the happiness of human life be promoted; civil fociety conduces to that end; civil focieties cannot be upheld, unless in each, the interest of the whole fociety be binding upon every part and member of it; and this ftep of the argument conducts us to the conclusion, namely, that as long as there is an interefl of the whole fociety requires it, that is, as long as the eftablitement of government cannot be refilled or changed without public inconvenience, it is the will of God (which will universally determines our duty) that the eftablitement of government be obeyed; and no longer. This princiile being admitted, the juftice of every particular cafe of refiilance is reduced to a computation of the quantity of the danger and grievance on the one fide, and of the probability and expence of redifting it on the other. If it be asked, who shall judge of this? the an- fwer is, "Every man for himself." In contenotions between the Sovereign and the fubject, the parties acknowledge no common arbitrator; and it would be abfurp to refer the decision to thofe whose whole conduct has provoked the question, and whose own interefl, authority, and fate, are immediately concerned in it. From the refolution of "public expediency" into the place of all implied compacts, promises, or conventions whatever, our author infers, 1. That it may be as much a duty at one time to refiil government as to obey it, yea, when more advantage will in our opinion accrue to the community from refiilance, than mischief. 2. That the lawfulnefs of refiilance, or the lawfulnefs of a revolt, does not depend alone upon the grievance which is fuffred or found, but also upon the probable expence and event of the conteft. Hence thofe who concenred the revolution in England were juftifiable in their counfels. 3. That irregularity in the firft foundation of a flat, or fubfequent violence, fraud, or injustice in getting poifition of the fupreme power, are not fufficient reafons for refiilance, after the government is once peaceably fettled. 4. That refiilance is not justified by every infraction of the fubject's rights, or liberty, or of the confitution; by every breach of promife, or of oath; by every fretch of prerogative, abuse of power, or neglect of duty on the part of the chief magiftrate; unless these crimes draw after them public confidences of fufficient magnitude to outweigh the evils of civil disturbance. 5. That no age, law, or authority whatever, is fo binding, that it need not be continued, when it may be changed with advantage to the community. 6. As all civil obligation is refolved into expediency, what, it may be asked, is the dif- ference between the obligation of an Englishman and a Frenchman, or why is a Frenchman bound in confience to bear any thing from his king, which an Englishman would
not be bound to bear, since the obligation of both is founded in the same reason? Although their conditions may differ, their rights should seem to be equal; and yet we are accustomed to speak of the rights as well as the happiness of a free people, compared with what belong to the subjects of absolute monarchies; and how, it may be reasonably inferred, can this comparison be explained, unless we refer to a difference in the compacts by which they are respectively bound? In order to obviate this difficulty, it is allowed that a Frenchman is in confidence bound to endure many things from his prince, to which an Englishman would not be bound to submit for the following reasons; viz., because the same act of the prince is not the same grievance where it is agreeable to the constitution, and where it infringes it; and because redress in the two cases is not equally attainable. The duty of obedience is defined by different boundaries, and the point of justifiable resistance is placed at different parts of the scale of suffering—all which is sufficiently intelligible without a social compact. 7. The interest of the whole society is binding upon every part of it. If we appeal to the Christian scriptures with regard to the duty of civil obedience or the extent of our civil rights and obligations, Christianity hath left us where the found us; she has neither altered, nor ascertained it. The two passages to which writers have generally referred in their investigation of this subject are Romans xiii. 1—7, and 1 Peter ii. 13—18. In order to comprehend the proper import of the instructions contained in these passages, there are two questions relating to the subject of civil obedience, which should be considered, viz., whether to obey government be a moral duty and obligation upon the confidence at all, and how far, and to what cases, that obedience ought to extend? These passages, it may be observed, inculcate the duty; but they do not describe the extent of it. The due consideration of this distinction is sufficient to vindicate these passages of scripture from any explanation of them that shall favour an unlimited passive obedience. But admitting what many commentators have stated, that an opinion was privately cherished by the first Christians, which led them to conceive, that their conversion to Christianity entitled them to new immunities, to an exemption as of rights (however they might give way to necessity) from the authority of the Roman sovereign; we are furnished with a full and satisfactory interpretation of the Apostle's words. The two passages apply with great propriety to the refutation of this error. Little need be added in explanation of particular clauses. St. Paul has said, "wheresoever resisteth the power, resisteth the ordinance of God." This phrase, "the ordinance of God," is by many so interpreted as to authorize the most exalted and supercilious ideas of the regal character. But surely such interpreters have sacrificed truth to adulation. For, in the first place, the expression, as used by St. Paul, is just as applicable to one kind of government, and to one kind of succession, as to another—to the elective magistrates of a pure republic, as to an absolute hereditary monarch. In the next place, it is not affirmed of the supreme magistrate exclusively, that he be the ordinance of God; the title, whatever it imports, belongs to every inferior officer of the state as much as to the highest. The divine right of kings is, like the divine right of popes, in the law of the land, or even actual and quiet possession of their office; a right ratified, we humbly presume, by the divine approbation, so long as obedience to their authority appears to be necessary or conducive to the common welfare. Princes are ordained of God by virtue only of that general decreed, by which he asents, and adds the function of his will, to every law of society, which promotes his own purpose, the communication of human happiness: according to which idea of their origin and constitution, and without any repugnancy to the words of St. Paul, they are by St. Peter denominated the "ordnance of men." Paley, ubi supra. See King, Law, Liberty, Magna Charta, Parliament, Passive obedience, &c.

Government, in Grammar, is understood of that construction of nouns and verbs, wherein they require some alteration to be made in others joined or constructed with them.

Construction is divided into two parts; that of concur, and that of government, called also regimen. See Concord, and Regimen.

GOVERNOI.O, in Geography, a town of Italy, in the department of the Maine; 12 miles S. E. of Mantua.

GOVERNOR, an officer upheld by a king, or sovereign prince, with the command and administration of a province, place, &c.

A governor represents the king; and not only commands the garrison, troops, &c. but the citizens, &c. A governor of a fortified place was anciently required to hold out three attacks, before he surrendered.

Governor is also frequently used for a president or superintendant.

Thus we say, the governor of the bank; the governor and directors of the South Sea company; the governor of an hospital, &c.

GOVER, in Geography, a town of Hindooftan, in the cirec of Rajamundry; 10 miles W. N. W. of Rajamundry.

GOUGE. See GOLF.

GOUFRE, in Geography, a town of Canada, in the river St. Lawrence; 50 miles E. of Quebec.

GOUGAN-BANNA, a lake of Ireland, in the county of Cork, not far from Inishgeele. The river Lee rises in a mountain above this lake, through which it flows. It was formerly the residence of St. Fin-Bar, and is visited by great numbers of pilgrims, whilst its romantic beauties attract a few travellers, notwithstanding the ruggedness of the road.

GOUFRÉ, William, in Biography, who flourished in the former part of the seventeenth century, was born in the parish of Bow, in the year 1575. He was educated partly at St. Paul's school, and partly at Eton, and, in 1595, he was elected to King's college, Cambridge. Here, in due time, he performed with much applause all the exercises required by the statutes, and took his degrees. In 1607, he was admitted into orders, and in the following year obtained the rectory of Blackfriars, London. In this situation he continued during the remainder of his life, discharging the parochial functions with great diligence and fidelity, and setting before his parishioners an example worthy of imitation. The zeal with which he performed the duties of his office, led him to establish a weekly lecture, which was frequented not only by his own people but by many of the London clergy, the members of the Inns of Court, and the more respectable and serious citizens. In 1628, he was admitted to the degree of doctor of divinity, and about the same period he became one of the trustees of the society that had united for the purpose of buying up improprations, to bellow them on such unpatronized clergymen as were distinguished for piety and other ministerial qualifications, which occasioned his being prosecuted in the Star-chamber. In 1651, he was nominated one of the assembly of divines, and was held in such reputation by that body, that he was often called to fill the moderator's chair during
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during his absence. He was selected as a proper person to write notes on the bible, and took, for his share of the work, from the beginning of the first book of Kings to that of Job. He died in the year 1653, soon after he had completed his 75th year. He had, for several years, been esteemed the father of the London miníters. In his departinent, he was modest, humble, and affable; he had a pious and benevolent spirit, and continued to preach as long as he had strength to walk into the pulpit. Besides the "Annotations" already referred to, Dr. Gouge published many other theological pieces, as "A Commentary on the Epistle to the Hebrews;" "An Exposition of the Lord's Prayer;" "The Whole Armour of God, &c.

GOUGE, THOMAS, son of the preceding, was born at Bow, in the year 1605; and, having, in his academical course, followed the steps of his father, he was first chosen fellow of his college, and afterwards preferred with a living at Colfden, near Croydon, in Surrey, where he continued but a short time; and, in 1638, he undertook the more important charge of St. Sepulchre's parish, London. During a period of twenty-four years he discharged the duties of his profession with the most exemplary zeal. Besides preaching twice every Sunday, and often on week days, he visited his flock, catechized their children, enquired into and relieved the wants of the poor, and devised plans for their employment. He is said to have given the hint which produced the humane and benevolent institutions of Mr. Firmin, which have been referred to in the memoir of that excellent citizen. When the act of Uniformity took place, he was too conscientious to sacrifice his principles on the throne of power, and was ejected from his living. His time was now zealously devoted to acts of beneficence and charity. He employed his own fortune, which was considerable, in relieving the wants of his poorer brethren, who, on account of their non-conformity, were deprived of their means of subsistence; and he was a useful agent in the rich, from whom he received large sums, which were applied to that humane purpose. In the year 1671, he set about a plan for introducing knowledge and religion into the different parts of Wales, which at that period were in the most deplorable darkness. He established schools in different towns where the poor were willing that their children should be taught the elements of learning, and he undertook to pay all the expenses which were incurred in the outfit of the buffins. By degrees these schools amounted to between three and four hundred, and they were all annually visited by Mr. Gouge, when he carefully enquired into the progress made by the young people, before whom he occasionally preached in a style adapted to their age and circumstances in life, until he was obliged to desist by prosecutions carried on against him in the ecclesiastical courts. With the affilliance of his friends, whose purses were ever open at his command, he printed eight thousand copies of the Bible in the Welsh language, a thousand of which were distributed freely among those who could not afford to purchase them, and the rest were sent to the cities and chief towns in the principality, to be sold at reasonable rates. He procured likewise the church catechism, and other practical pieces, to be printed in the Welsh language, and distributed among the poor. To these and such like charitable undertakings did Mr. Gouge devote his time, his talents, and his fortune, when precluded by the intolerance of the laws from officiating in the capacity of a preacher. He was accustomed to say with pleasure, that he had two livings, which he would not exchange for two of the greatest in England. These were Wales, where he travelled every year to diffuse the principles of knowledge, piety, and charity; and Chrift's Hospital, where he catechized and instructed the children in the fundamental principles of religion. He died suddenly in 1687, in the seventy-seventh year of his age. His death was regarded as a public loss. A funeral sermon was preached on the occasion by Dr. Tillotson, afterwards archbishop of Canterbury; who, at the conclusion of an animated eulogium on his piety and virtue, observes, that "all things considered, there have not, since the primitive times of Christianity, been many among the sons of men, to whom that glorious character of the son of God might be better applied, than he went about doing good." And Mr. Baxter, in his Narrative of his own Life and Times, says of Mr. Gouge, "I never heard any one person, of whatever rank, fort, or sect foever, speak one word to his dishonour, or name any fault that they charged on his life or doctrine; no, not the pretentioufes themselves, fave only that he conformed not to their impositions; and that he did so much good with fo much industry." This eminent Christian divinity published a few practical pieces, of which the following may be mentioned; "The Principles of Religion Explained:" "A Word to Sinners:" "Christian Directions to walk with God:" "The Sureft and safest Way of Thriving, viz. by Charity to the Poor;" "The Young Man's Guide through the Wildernefs of this World." Gen. Biog. Neil's Hist. of the Puritans.

GOUGE, an instrument used by divers artificers; being a fort of round, hollow chisell; serving to cut holes, channels, grooves, &c. in wood, flone, &c.

GOUGEON, JOHN, in Biography, a French sculptor and architect in the reign of Francis I. and his successors, is reckoned the first who introduced a true taste for sculpture in France, and freed it from the barbarism of former times. He was employed in many of the public works with which Paris began to be decorated in the reign of Francis I. Of these the most considerable is the fountain of the Nymphs, called the Innocents, finished in the year 1550. Among the other remains of his workmanship is a tribune in the hall des Cent-Suiffes, at the Louvre, enriched with sculptures, and supported by four gigantic Caryatides. He was an able medalist, and truck several pieces for Catharine de Medicis, which are fought by the curious. He generally worked in small, and there are no detached figures or groups by his hand. His reliefs are executed with taste, his drapery is light and elegant, his figures graceful and flexible, but their attitudes somewhat forced. He was a Huguenot, and was shot as he was working on a scaffold, on the infamous St. Bartholomew's day, 1570. Gen. Biog.

GOUH'S ISLAND, in Geography, a small island in the Southern Atlantic ocean, discovered by captain Gough in 1715. It is very high land, in S. lat. 40° 15' W. long. 81° 57'. Some doubt being entertained with respect to its true longitude, it was recommended to M. de la Perouze to ascertain its true position, as it lies in the way of ships going directly to India, or China, early in the season, without touching at the Cape.

GOUJET, CLAUDE PEIER, in Biography, was born at Paris in 1597. His father, a tailor by trade, in vain opposed his inclination for a studious life. He was educated among the Jesuits, and, having taken orders, became a canon of the church of St. Jacques l'Hôpital in Paris. He was an associate of several academies in France, and was generally esteemed for his learning, and also on account of the mildness of his temper and the purity of his morals. He died in 1767, and had collected a library of ten thousand well chosen volumes, which was the basis of his numerous works. Of these, the following may be mentioned, "Vies des
des Saints," in two vols. 4to. "Supplement to Morer's Dictionnary," two vol. 8vo. "Bibliothèque des Écrivains Éclectiques," three vol. 8vo. "Différents de l'Université des Études depuis le xiv siècle." "Du L'Etat des Sciences en France depuis la Mort de Charlemagne jusqu'à celle du Roi Robert." This dissertation obtained for the author the prize of the Academy of Belles Lettres, and he was complimented by a deputation from that body, deferring permission to nominate him to the vacant place of the deceased abbé Vertot. Goujet was likewise author of "Bibliothèque François, ou Histoire de la Littérature François," 18 volumes 12mo, which is reckoned his most valuable work. Moreri.

GOJIN, in Geography, a town of Portugal, in the province of Beira; 12 miles S. W. of St. João de Pefquire.

GOJINPOUR, a town of Hindoostan, in Bahar; 26 miles S. of Bahar.—Also, a town of Bengal; 10 miles W. of Nakhingah.

GOULAMCOKDA, a town of Hindoostan, in the Mysore; 9 miles S. of Cooy.

GOULART, Simon, in Biography, a French Protestant divine, was born at Seulim in 1543. He began his studies late in life, but by persevering industry, he made a great proficiency in the learned languages, and was chosen pastor of the church which Calvin had been minister. Here he discharged the duties of his office with much diligence and success, till within a few years of his death, which took place in 1628, when he was about 85 years of age. He edited many works, performing at the same time the business of a commentator. Among these were the "Works of Plutarch;" "St. Cyriac's Works;" "Seneca's Works," &c. He made a collection of "Remarkable Histories" in 2 vols. 4to., and wrote several pieces relating to the history of his own times. The most interesting and curious of the latter description is his "Collection of the most memorable events which occurred during the League, with notes and original documents," in 8 vols. 4to. Many of his pieces were anonymous, but to these he usually prefixed the initials S. G. S. signifying "Simon Goulart Soulluifien." He had such an extensive acquaintance with the literature of his time, and knew so well to whom different publications, that were printed without the writer's name, were to be attributed, that Henry III. of France, being deficient of knowing who was the author of a piece published under the assumed name of Stephanus Junius Brutus, and intended to propagate republican doctrines, sent a perfon to Geneva to enquire into the matter of Goulart, but the latter refused to communicate the fact, for fear of exposing the author to ferior injury. Moreri Bayle.

GOULDSBOROUGH HARBOUR, in Geography, a harbour of the United States of America, in the district of Maine. N. lat. 44° 25'. W. long. 67° 53'.

GOULHERAUTF, a town of Thibet; 28 miles S. of Deoprag.

GOULOUR, a town of Hindoostan, in the circuit of Senare; 18 miles N. of Senare.

GOULSTON, Theodore, in Biography, was the son of William, rector of Wymondham, and was born in Northamptonshire. He became probationer fellow of Merton college, Oxford, in 1569; and, after applying himself to the study of physic in this university, he practised for a time with considerable reputation at Wymondham and its neighbourhood. At length, after taking his doctor's degree in 1576, he removed to London, and became a fellow of the College of Physicians, and afterwards senhor. He resided in the parish of St. Martin's, near Ludgate, and was in great esteem, as well for classical learning and theology, as for the practice of his profession. He died in the year 1612; and by an article in his will testified such regard to the interests of medicine, as entitles him to grateful commemoration. This was a bequest of 200 pounds, to purchase a rent charge for the maintenance of an annual pathological lecture within the College of Physicians, to be read by one of the young doctors of the College. The public has been indebted on several occasions to this institution for ingenious dissertations, delivered as Gulifonian Lectures; as those of Dr. Murgrew; Dr. Fordyce's Treatise on Digestion; &c.


GOUMEL, in Geography, a town of Africa, and capital of the country of the Foulahs, and residence of the Sarkitik. N. lat. 16° 16'. W. long. 11° 32'.

GOUNDA, a town of Hindoostan, in Oude; 32 miles E. N. E. of Manickpaur.

GOUPIL, James, in Biography, a physician of the sixteenth century, was born in the province of Poitou. He acquired a considerable knowledge of the ancient languages, and afterwards directed his studies to medicine, in the schools of Paris, where he graduated in 1547. His talents attracted the attention of the court, and he was appointed by Henry II. to the professorship of medicine in the royal college, in 1555, a vacancy being occasioned by the death of Sylvis. He is principally known as an editor and annotator of the writings of Diocedes, Alexander Trallian, Actarius, and some other Greek writers: and he was engaged in the fame labour, in respect to some of the writings of Hipocrates, when his studies were terminated by death, in 1568.

Eloy.

GOUR, called also Lucknow, in Geography, the ancient capital of Bengal, supposed to be the "Ganga Regia" of Ptolemy, which stood on the left bank of the Ganges, about 25 miles below Rajenmul. N. lat. 24° 53'. E. long. 88° 14'. It was the capital of Bengal 750 years B. C. and was repaired and beautified by Achbar, A. D. 1575, who gave it the name of "Jennuteabad," which same part of the circus in which it was situated still bears. It was deserted, as it is said, on account of the unhealthiness of its air. Taking the extent of the ruins of Gour at the most reasonable calculation, it is not less than 15 miles in length, along the old bank of the Ganges, and from two to three in breadth. Several villages stand on part of its site; the remainder is either covered with thick forests, the habitations of tygers and other beasts of prey, or become arable land, whose foil is chiefly composed of brick-dust. The principal ruins are a mosque lined with black marble, elaborately wrought; and two gates of the citadel, which are grand and lofty. The bricks, which continue to be an article of merchandise, are of a peculiarly folid and durable texture.

GOURA, or GURA, a town of the duchy of Wallack on the Verna; 12 miles from Warfaw.

GOURA, a town of Perifin, in the province of Irak; 35 miles E. of Izphahan.

GOURAY, a cape on the E. coast of the island of Jersey; 4 miles E. of St. Helen.—Also, a town of France,
GOUD, in Bata. See CECCUBITA.

GOURD, Biter. See COLCUS.

Gourd, Indian tree. See CRESCENTIA.

Gourd, Smur. See BAOAR.

Gourd, zoom. The English name of a species of worm found in the intestines of several animals. It has this name from its resembling the seed of the gourd in figure.

GOURDON, in Geography, a town of France, in the department of the Lot, and principal place of a district, 16 miles N. of Cahors. N. lat. 46° 44'. E. long. 1° 28'. The place contains 1703, and the canton 12,115 inhabitants, on a territory of 1725 kilometres, in 15 communes.

GOURDY, Legs of Horse. See GREASE.

GOURKEY, in Geography, a town of Hindoostan, in Oude; 10 miles N. W. of Lucknow.

GOURGONG, a town of Hindoostan, in Allahabad; 10 miles N. of Corah.

GOURGON'TY, a town of Hindoostan, in Golconda; 36 miles W. S. W. of Rachore.

GOURK, a town of France, in the department of the Morbihan, and chief place of a canton, in the district of Pontivy, 12 miles N. W. of Pontivy. The place contains 374, and the canton 11,819 inhabitants, on a territory of 2424 kilometres, in five communes.

GOURMA, a town of Abyssinia, on the coast of the Red Sea. N. lat. 14° 52'.

GOURMUNGUL, a town of Hindoostan, in Golconda; 12 miles S.W. of Mallar.

GOURMELEN, Etienne, in Biography, was a native of Brittany, and was sent at an early age to Paris, where he studied surgery, and afterwards medicine; in the latter of which he took the degree of doctor in the year 1559, and was elected dean of the faculty in November, 1574. Surgery, however, continued to be the favourite object of his attention, and he was appointed by Henry III. professor of surgery in the Royal College in the year 1588. But he did not long fill his chair, for he died in 1594. His writings, which were valuable in their day, have now left their interest, in consequence of the great improvements of modern surgery; they consist of a Synopsis Chirurgica, printed in 1566, and afterwards translated into French; a Latin translation of Hippocrates De Alimentis, with a commentary; and a treatise, entitled Chirurgia Artis ex Hippocratis et Veterum decretis ad rationem norman reddita, Libri tres, 1580. Elyot, Dict. Hist.

GOURNAY, Le Jars de, Mary, was born at Paris in 1506. She was, while very young, deprived of her father, and acquired an adoptive one in the celebrated Michel Montagne, who became the object of her enthusiastic admiration. After the death of Montagne she became heiress of his writings, and published an edition of his Effays, dedicated to Cardinal Richelieu. She had well improved the leons of youth, and was intimately acquainted with the learned languages. She maintained a correspondence with many of the most eminent literary characters of the age, by some of whom she was honoured with the title of "Tenth Muse," by others she was denominated the "French Siren;" it is not, however, improbable, that the uncommonness of female learning at that time in France, rather than the intrinsic merit of her writings, excited admiration. In her own language she wrote a style and awkward style, and her taste in reading was usually turned to the compilations and commentaries of past ages. She passed her life in celibacy, contented with a small pension from the court, and much esteemed by her particular friends, some of whom were persons of high rank. She died at Paris in 1615, in her 57th year, and was honoured with many epistles from literary characters. Her works were collected in a quarto volume, under the title of "Les Avis ou les prelins de la Demoiselle de Gournay." Her temper was apt to be violent, and she was very retentive of real or supposed injuries; by these means she made herself many enemies, who attacked her in their writings, in which neither her person, nor the defects in her character were spared. Bayle. Moreiri.

GOURNAY, in Geography, a town of France, in the department of the Lower Seine, and chief place of a canton in the district of Nenfis-l-tel, 24 miles E. of Rouen. N. lat. 49° 29'. E. long. 1° 47'. The place contains 3543, and the canton 11,301 inhabitants, on a territory of 183 kilometres, in 19 communes.

GOURNEI, a town of Egypt, on the site of the ancient Thbes.

GOURPE, See GREENOCK.

GOURRI, a town of Abyssinia; 35 miles S.W. of Affaf.

GOURVILLE, John Herould de, in Biography, born at Rochefoucauld in 1615, was taken by the celebrated duke of that title into his service as valet de chambre, but in a short time he became his confidential friend. He was patronized by the great Condé, and was employed by the supernardent Fouquet, in public business. So well did he approve himself to his employers for political talents and integrity that he was proposed to the king as successor to Colbert in the ministery. He died in 1705, leaving behind him Memoirs of his Life from 1642 to 1668, in two volumes 12mo. These memoirs are written with frankness and simplicity, in a lively, though incorrect style, and they contain many curious and well-authenticated anecdotes of the ministers and principal persons of his time, of which, it is said, Voltaire made much use. Moreiri.

GOURY PASHEM, in Natural History, a name given by the people of the East Indies to a kind of orpiment of a deep yellow colour, veined with red in several places, and in some with white. It is found principally at the bottoms of mountains. They calcine it several times, and afterwards give it internally after intermitting fevers, and use it externally in ointments for the itch.

GOUSSET, James, in Biography, was born at Blois in the year 1635. He was educated for the ministeriy, and was chosen pastor of the Protestant church at Poitiers in the year 1662. He was thrice invited to undertake the professorship of divinity at Saumur, but refused to quit his flock till compelled to become a fugitive from the kingdom, in consequence of the revocation of the edict of Nantes. On this occasion he took refuge in Holland, and afterwards was setted, as French minister, at Groningen, where he likewise exercised the offices of professor of divinity, and of the Hebrew language in the university of that city. He died there in 1704, in his sixty-ninth year. His principal works were Differtations in Controversy with the Jews, 1699. Commentarius Linguar Hebrew, 1702, which form a valuable Hebrew dictionary, of which the bell edition was published at Leipsic in 1743. Differtations in Epitola Pauli ad Hebræos, &c. 1712. At his death he left behind him numerous MSS., among which are commentaries upon the whole of the sacred scriptures. Moreiri.

GOU'T, Gour, a French term, for what the Italians call giogo, and we tayle.

GOUT, in Medicine, a disease principally characterized by inflammatory attacks of the joints, more especially of the
foot, which return at intervals, and are connected with derangement of the digestive organs. The term, however, includes such a variety of morbid affections, in its extended sense, that it is not easy to give a concise definition of it; and we must have recourse to a more ample description of those affections, in order to convey a just notion of its signification.

The ancient physicians included all the varieties of inflammation, that are liable to occur in the joints, under the general term, *Aristitis* (from αίρητος, a joint, with the termination ἕται, denoting inflammation,) for the distinctions, made by modern physicians, between the two modifications of inflammation in the joints, now denominated gout and rheumatism, had not then been attended to. The term *Aristitis*, however, was used both as a generic and specific term, and signified, not only inflammation of the joints generally, but the ordinary form of gout by way of excellence. But the Greeks also gave specific names to the varieties of arthritis, according to the particular joints which the disease occupied: thus, for the ordinary form of gout in the foot the term ποσεγγα, podagra, was employed, which also became a generic title; for gout in the hand, the word γυνιγγα, chiragra; and for gout in the knee, γυνιγγα, gonagra; and so on. Among the species of arthritis was also included the *ijchia, staictica, or hip-gout*, which is now deemed a species of rheumatism. These terms the Romans adopted; and they are still retained in medical language. Our vernacular term *gout*, which came to us probably through the French, *la goutte*, originated in the dark ages among the humoral physicians, who considered the disease as arising from the flow of a morbid humour, *guttain*, as it were, upon the joints; hence, the name *gutta*, or *drop*, was applied to the disease. This term, according to Du Cange, was used by Sallustius, a Dominican of the 13th century, who writes, "cum *gutta*, quam podagram vel arthriticam vacant, frequentem vexaretur." Milagroire de Arthritide.

In consequence of the various forms which gout assumes, physicians have divided it under two heads, *regular* and *irregular* gout, or, as some have termed it, *tonic* and *atonic* gout; the former occurring in the earlier periods of life, while the strength or tone of the system remains unbroken; the latter, after a certain degree of weakness, or atony of the constitution, has been produced by the frequent attacks of the disease, advanced age, or other causes. We shall first describe the symptoms by which these forms of the disease are characterized, and afterwards state the canons and method of treatment, together with the speculations of pathologists, respecting the nature of the disease, beginning with an account of the paroxysm of gout.

*Regular Gout.*—It is an inflammatory affection of the joints of the foot, which constitutes what is called a fit or paroxysm of the regular gout. This sometimes comes on suddenly, without any warning of its approach; but it is generally preceded by several symptoms, especially by those of indigestion, as heart-burn, flatulence, and heaviness after meals, with eructations of acid or bitter matters, and some degree of languor and torpor of the body; but immediately before the fit the appetite is sometimes unusually sharp. There is also often an unusual coldness of the feet and legs for a few days preceding the fit, with the cessation of the perspiration about the former; a frequent numbness, alternating with a sense of pricking, along the whole of the lower extremities; occasional cramps of the muscles of the legs; and an unusual turgescence of the veins, are occasionally observed.

The attack is sometimes felt in the evening, but more commonly about two or three o'clock in the morning; when the patient is awakened from a quiet sleep by a pain affecting one foot, generally the ball or first joint of the great toe, but sometimes the other parts of the foot, or the ankle. This pain is accompanied with more or less of chilliness and shivering, which, as the pain increases, gradually ceases, and are succeeded by a hot race of pyrexia, or symptomatic fever, which continues during the same time as the pain. The pain becomes by degrees more and more violent; at first it is attended with a sensation, as if warm water were poured upon the membranes affected, and is said to resemble the pain of a dislocated joint; as it becomes severe it is sometimes described as resembling the pain of a tenion, or laceration of the ligaments, sometimes as like that from the grazing of a dog, and sometimes as a feeling of weight and conflagration of the membranes of the part, which becomes so exquisitely tender, as not to endure the weight of the bed-clothes, nor even the shaking of the room from a person walking briskly in it. Hence, great restlessness of the whole body, and especially of the part affected, always accompanies the fit; the patient confiantly changing his posture, with a view to ease the pain, which, nevertheless, continues severe all the following day, until mid-night, after which it gradually remits; and about two or three in the morning, that is, after twenty-four hours from the first attack, it commonly ceases almost entirely; and this freedom, with the breaking out of a free perspiration, allows the patient to fall asleep. On waking, he finds the pain slight, and the part affected with some redness and swelling.

When a paroxysm has thus come on, although the violent pain, after the period of twenty-four hours, be considerably diminished, yet the patient is not entirely without pain. For some days he has a return every evening of pain and fever, which continue, with more or less violence, till morning. After continuing in this manner for several days, the disease sometimes goes off entirely, not to return till after a long interval; and in such cases it generally leaves the person in very perfect health, enjoying greater ease and alacrity in the functions both of body and mind, than he had for a long time before experienced.

It often happens, however, that the disease does not thus speedily quit the patient, especially when he has previously suffered considerably from its attacks. For, instead of ceasing altogether after a few days, it seizes the other foot in the same manner as it did the former, both in respect to the vehemence and duration of the pain. Most commonly the foot first affected becomes quite easy, in such a cafe, and even as strong and healthy as if it had not been diseased; but sometimes both feet are affected together, and with equal violence. When this happens, the succeeding exacerbations, as Sydenham remarks, are less regular both, as to the time of coming on, and as to their continuance; but the pain always increases in the evening and remits in the morning; and what is called a fit of the gout, which goes off sooner or later, according to the age and constitution of the patient, is made up of a number of these little fits. For when this disease lasts two or three months, it is not to be esteemed one continued fit, but rather a series of small fits, the last of which proves milder and shorter, until the whole is terminated. In strong constitutions, and such as have the gout feilum, the attack is commonly finished in fourteen days; but in those of advanced life, or who have frequent returns of the disease, these series of fits will continue for two months; and in such persons as are more debilitated, either by age or the long continuance of the disorder, it will not...
G O U T.

go off till the summer advances, (beginning, as is most common, in January, or early in February,) which seems to drive it away.

When the fit is going off, a violent itching seizes the foot, especially between the toes, and the cuticle peels off. The appetite and strength return sooner or later, according to the greater or less severity of the preceding fit, and the interval of health between the paroxysms is generally nearly in the same ratio; i.e. longer in proportion to the greater violence of the last fit. At the beginning of the disease, Dr. Cullen observes, the returns of it are sometimes only once in three or four years; but after some time the intervals become shorter, and the attacks become annual: afterwards they come twice each year, and at length recur several times during the whole course of autumn, winter, and spring; and as it happens that, when the fits are frequent, the paroxysms become also longer, so, in the advanced state of the disease, the patient is hardly ever tolerably free from it, except, perhaps, for two or three months in summer.

Before the disease becomes thus inveterate, however, it has gradually assumed other appearances, and attacked other parts of the body. At first it commonly affects one foot only; but afterwards every paroxysm affects both feet, the one after the other, and then both together; and its changes of place, as it continues to recur, are not only from one foot to the other, but also from the feet into other joints, as the hands, wrists, elbows, knees, &c.; so that there is scarcely a joint in the body that is not, on one or other occasion, affected. It sometimes feizes on two different joints at the same time; but more commonly it is severe in a single joint only, and pallies successively from one joint to another; so that the patient's affliction is often protracted for a long time. The pains, indeed, are commonly less violent, in this state of the disease, than they were at first; but, in addition to them, loss of appetite, sickness, and other symptoms of the atomic gout, now afflicts him. Besides, in the intervals between the first paroxysms of the disorder, the joints which had been affected were entirely restored to their former suppleness and strength, and were free from pain or uneasiness, and all the functions of life were well performed. But in this protracted condition of the disease, the joints remain not only weak and flabby, after the termination of the fit, but they become at length so contracted and disabled, that although the patient can stand, and perhaps walk a little, yet it is very slowly, and with great lameness and difficulty, so that he is scarcely able to move from room to room; and sometimes the joints lose their motion altogether.

In many persons, though not in all, when the disease has frequently recurred, this immobility of the joints is farther increased by the formation of concretions, of a chalky appearance, upon the outside of them, and for the most part immediately under the skin. The formation or deposition of this matter is characteristic of the disease, being the consequence of gouty inflammation alone. It seems to be deposited at first in a fluid form, but afterwards becomes dry and firm; in which state the concretions have the appearance of a friable earthy sub stance, and have been called chalk-stones (which see). From the investigations of Dr. Wallon, however, and other modern chemists, it has been ascertained that they contain no calcareous or earthy matter, but consist of a neutral salt, formed by the combination of the lithic or uric acid, with the fixed alkali, soda,—constituting a nitrate or urate of soda. These concretions form principally about the joints of the toes and fingers, in little nodules, which Sydenham compares to crab's eyes; but sometimes they appear about the larger joints, as the elbow and knee, occasioning a whirling swelling almost as large as an egg, which becomes gradually incised and red. Mr. Watton has related an example of a very extensive deposition of urate of soda, in a gouty man, who was a martyr to the disease. Chalk-stones not only enveloped the joints of his great toes, formed tumours upon his legs, and, being mixed with the synovia of the large joints, rendered this fluid as thick as cream; but "the joints of the fingers were swelled and knotty, every knot being a lump of chalk; and I was told," he adds, "that when he played at cards, he needed frequently to score up the game with his knuckles." (See Medical Communications, vol. i. art. 3.—See also Parkinson's Obs. on the Nature and Cure of Gout, p. 5.)

Such is the progress of gout, as it affects the joints, and while it may, therefore, be called regular gout. Sydenham, indeed, and some other writers, confine the appellation of regular to gout in the feet only; and consider it as irregular, when it attacks the hands or other joints. But Dr. Cullen, Warner, and the physicians of the present day, in general, agree in calling the disease, when it affects only one inflammatory affection of the joints, the regular gout; "as," says Dr. Cullen observed, "whatever symptoms we can perceive to be connected with, or to depend upon, the disposition which produces that inflammatory affection, but without its taking place, or being present at the same time, we name the irregular gout." First Lines, § 518.

Irregular gout, anomalous, internal or atomic gout, as it has been also called, consists of various symptoms of disorder in the internal organs of the body, which do not differ from the symptoms affecting the same organs under other circumstances; it is, therefore, suspected that these symptoms are of gouty origin, when they occur in persons bearing the marks of a gouty diathesis or disposition: and especially when, in such habits, either a manifold tendency to the inflammatory affection of the joints has formerly appeared, or when the symptoms alluded to are intermixed with, and are relieved by, some degree of the inflammatory affection. The morbid symptoms which appear, in such cases, and are considered as signs of atomic gout, are principally affections of the stomach; such as loss of appetite, indigestion, and its various concomitants of sickness, nausea, vomiting, flatulence, acid eructations, and pains in the region of the stomach. These symptoms are frequently accompanied with pains and cramps in the upper extremities of the body, which are relieved by the discharge of wind from the stomach. Together with these affections of the stomach, colic pains also commonly occur; but sometimes a hoarseness with colic pains. These affections of the alimentary canal are often attended with all the symptoms of hypochondriasis; as desolation of mind, a confendant and anxious attention to the slightest feelings, an imaginary aggravation of these, and an apprehension of danger from them. In the same atomic gout, the viscera of the thorax are also sometimes affected, and palpitations, faintness, and ahuma occur. And the head also is often disordered, with pains, giddiness, somnolence, and even apoplectic and paralytic affections. (Cullen. See also Mulgrave "De Arthritis Atonam," where these various modifications of irregular gout are described at length; and Warner’s "Full and Plain Account of the Gout," where his observations are translated, pp. 70—90, second edit.)

We may here remark, in passing, that many errors have probably been committed, in considering almost every species of indisposition, that occurs in gouty habits, as arising...
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from the gouty diathesis. We remember to have heard this point fireaneously insisted upon by the able professor of ph ysics, in the university of Edinburgh, Dr. Gregory. Many of the symptoms above enumerated are obviously connected with the impaired functions of the stomach, and occur in dyspepsia, or indigestion, in habits not gouty; such are the various hystchondriac faliactions; the palpitations of the heart, often arising from over-distention of the stomach with flatus, by which the heart is mechanically pressed upwards: the cramps in different parts of the body, which are often relieved by a discharge of wind from the stomach; the difficulty of breathing, often occasioned by great distension of the stomach, which impedes the descent of the diaphragm; and the head-ache, giddiness, &c., which are daily observed to be connected with impaired digestion. On the other hand, inflammatory disorders of the lungs and other viscera, congections in the head, inducing headache, faintness, vertigo, &c., and ultimately various degrees of paralytic and apoplectic disease, not essentially different, in any respect, from the same affections in habits not tainted with gout, have probably been suffered to go on, and to prove fatal, under a notion that they were gouty, and the proper remedies have been therefore neglected.

The irregular gout occurs in a less equivocal form, when the inflammatory state of the joints has come on in the usual manner, but when, without arising to the ordinary degree, or at least without continuing for the usual time, and receding gradually, as is common, the pain and inflammation suddenly and entirely cease, while some internal part becomes disordered. This has been called the retrocedent or refelled gout. When the gout is thus retrocedent, the same internal parts are attacked, and the same disorders produced, as in the irregular or atomic gout, where no previous imperfect attack upon the joints had been itself. The stomach is for the most part commonly affected, whence violent pain, ficknefs, vomiting, anxiety, &c.; the heart and lungs are also occasionally attacked; and sometimes the occurrence of apoplexy, palsy, or delirium, mark the head as the seat of the retrocedent disease.

Another variety of irregular gout has been denominated misplaced gout: namely, when, instead of the joints of the extremities, the stomach, brain, lungs, intestines, kidneys, or bladder, become affected with symptoms of inflammation, which give way upon the appearance of the inflammation in the extremities, when that takes place. This inflammation of the internal organs, however, is indicated by the same symptoms which accompany inflammation of the same parts, arising under other circumstances, and in constitutions not gouty: and it has probably been sometimes supposed to be of gouty origin, when it arose from the ordinary cause. Dr. Cullen affirms, that he never met with any instances of misplaced gout in his practice, and that no case has been distinctly made out by medical writers, except that of pulmonary inflammation. But he had known two varieties of internal disease alternate with external gouty inflammation: viz. the one an affection of the neck of the bladder, producing pain, strangury, and catarrh with eflac; the other an affection of the rectum, sometimes marked by pain alone in that part, and sometimes by hemorrhoidal swellings.

Such are the phenomena, by which the various forms of regular and irregular gout are chiefly characterized. The next object of our inquiry will be the

Causes of Gout.—Among the prevailing causes of gout, an original peculiarity of constitution, often transmitted from the parent to the offspring, appears to be the most common. In other words, the disease is said to be hereditary. This position, indeed, has been controverted, especially by Dr. Cadogan (see his Diff. on the Gout, and all Chronic Dis- eases, p. 7.) but the discussion has turned upon a mere dispute about words. For it is admitted, on all hands, that the predisposition of the constitution to be affected by gout is transmitted from father to son, like other peculiarities of habit; like the family-likeness, for instance, in features, in voice, complexion, &c. It is true, indeed, as Dr. Cadogan contends, that some persons acquire this gouty disposition, who have it not by hereditary transmission; and, on the other hand, that the hereditary predisposition may be constituted by various causes, but particularly by certain modes of life, so that the disease itself shall never appear. Yet it is equally true, that the same occasional causes, which will excite the disease in those who are hereditarily predisposed to it, will not produce it in others, although applied in greater force; and, therefore, the existence of an original constitutional predisposition must necessarily be inferred. The middle and advanced periods of life are also more disposed to gout, than the early periods: thus it does not commonly attack men until after the age of thirty-five, and generally not till a little later period. When the gout does appear, in more early life, of which there are instances, it seems to be in those in whom the hereditary disposition is very strong, and to whom the exciting causes have been applied in a considerable degree. Hippocrates remarks, that cunachs are not liable to be affected by gout, nor boys previous to venery: but the temptation included in the remark is probably unfounded; since, with respect to the latter, the disease, as we have already stated, is almost peculiar to an advanced period of life, and the cunachs, who, in the time of Hippocrates, were chiefly Persian slaves, were doubtless confined to the strict discipline and the frugal and temperate life, which the rigorous laws enjoined to all, and therefore not exposed to the most active causes of gout. For Galen, in his commentary upon this observation of Hippocrates, observes that, in his time, the remark was no longer true, "owing to too much indulgence on their part in an indolent, as well as intemperate mode of life," and the remark is confirmed by modern experience. (Van Swieten, loc. cit.)

It has been fully ascertained, indeed, that the principal source of the gouty habit consists of high feeding and indulgence conjoined. Sydenham (who, upon the subject of gout, stands unrivalled in accuracy of observation, and the model of all succeeding writers, many of whom have done little more than copy his history of it) begins his account of the disease with these remarks. "The gout generally attacks those elderly persons who have formed the greater part of their lives in ease and indulgence, both in the use of high feeding and of wine, or other spirits and fermented liquors; and who, in conformance of the flagellants of advanced life, have ceased from all those exercises to which they were accustomed in their youth. The gout, however," he adds, "does not always wait till an advanced age; it sometimes attacks those who are in the prime of life. But these persons have unfortunately received the seeds of the disease from their parents; or, if not, they have indulged in premature and excessive venery, or left off entirely those exercises which they had previously used with great activity, and have been belied most indulgent to the appetite, and drank to excesses of wines and spirituous liquors, afterwards suddenly turning to those that are cold and cold." (Sydenham, Tractatus de Pedegrn.) These facts have been long known. There is a Greek etymology Etcdly signifying "Bacchus and Venus'" or "Bacchus and Venus' charming Egyptian" Yoshis is born a daughter, the limb-relieving Gout." And a similar observation is contained in the adapte, "Bacchus pater, Venus mater, et Ira oblitentica Athletus." While this fact is confirmed,
confirmed, on the one hand, by the testimony of ages in the affirmative, it is corroborated also, on the other hand, by observation in the negative. Dr. Cullen remarks that gout seldom attacks those who are engaged in bodily labour, or who live much upon vegetable aliment, or those who make no use of wine or other fermented liquors. Indeed, the gout is said to be altogether unknown where these liquors are not used, as among the common people of Turkey. Among the lower orders of people, even in this country, the disease is very rare, and still more rare in Scotland and Ireland, where animal food and strong ale and beer are less used. Van Swieten observes, that some people who, from comfortable circumstances, have been reduced to labour for their subsistence, and to exchange a luxurious table and indulgence for a frugal diet and activity, have lost their gout. He mentions particularly the instance of a certain priest, who enjoyed a rich living, and had been an old and constant sufferer from the gout; but happening to be taken by the pirates of Barbary, he was kept constantly at work in the galleys for the space of two years: "which had this good effect, that afterwards, when he was ransomed from captivity, leaving off all his trouble-some and monitory fatness, he never once had a fit, though he lived several years after the event." (Van Swieten, Comment. ad Aph. 1255.) Several anecdotes of a similar nature are related by the indubious Schenckius. (Obs. Med. Rurico. Bb. v. p. 657. edit. 1644.) In a word, much exercise, which will often counteract the influence of intemperance, will, when combined with temperance, counteract even the hereditary disposition to the disease.

The effect of full living and indulgence, in producing the gouty diathesis, is also manifested from the form and temperament of the persons in whom it occurs. These are especially men of robust and large bodies with large heads, and of full and corpulent habit. They have commonly also a crosser skin; and if, with the ancient, we might denote the tempers of men by certain terms, we should say that the gout especially afflicts men of a chal nic-fangarine temperament, and seldom attacks the purely fanguine or melancholic.

Women are not very liable to the gout, probably from their less temperate mode of life, in general, than that of men: but those females whom it attacks are generally of robust and full habits. It is said not to occur in them commonly till after the cessation of menstruation; which perhaps only implies that it is a disease of advanced life. For as Dr. Cullen justly remarks, "it often happens to such the robust body..." before the menstrual evacuation has ceased," and he had "found it occurring in several females, whose menstrual evacuations were more abundant than usual." (Fifth Lincs, § 494.) A fact, which we may explain, with Dr. Gregory, by observing, that those women who indulge much in vinous and fermented liquors, are more liable to menstruation than others.

It is obvious, then, that the experience of all ages concurs in affirming intemperance and indulgence as the principal causes of that habit of body, in which the gout is liable to occur. This habit, or predisposition, seems to be sufficient, in many cases, to produce the disease itself, or at least to require the application of slight and imperceptible exciting causes to bring it forth. The disease, indeed, depends to much upon predisposition, that it is difficult to assign the occasional causes; the same agents appear to be sometimes the generators of a predisposition to it only, and at other times actually to excite the disease.

The exciting causes, which often suddenly bring on a fit of the gout, in those who are predisposed to it, are, in the first place, those circumstances which induce a sudden debility, especially of the stomach. The concurrence of indigestion, and the local inflammation in gout, is one of the characteristics of the disease; and, as we have already stated, the latter is usually preceded for some time by the former. Hence whatever suddenly depresses the digestive power, is liable to induce the local and constitutional disease. Thus a paroxysm of gout has frequently been excited by an occasional excess in the use of wine or spirits; by overloading the stomach with food, or by eating such as is not easily digestible in its nature; by the copious use of vegetable acids or aseptic matter, especially by weak aseptic wines, punch, &c., all of which tend to debilitate the digestive organs either directly or indirectly. In the same way, excess of venery, which powerfully influences the stomach, (Van Swieten, Aph. § 86, and 1255.) has often brought on a fit. This seems to have been universally understood by the ancients. We have already noticed the observation of Hippocrates; and Aëtion, in recounting the general causes of gout, says, there are, "abounding eructations, frequent drunkenness, and, above all, an immediate use of venery." (Sermon xii. Cap. 6.) Sydenham and Van Swieten add their testimony to the fact. Intense study, night-watching, excessive anxiety and attention to business, all of which greatly depress the power of the body in general, and of the stomach in particular, destroying the appetite, and producing a sene of uneasiness, fasting, or weight about the region of the stomach, are likewise enumerated among the occasional causes of the gouty paroxysm. The same is true with respect to the violent motions and passions of the mind, more particularly of anger. "In obstruxar arcaestis" is part of the adage above quoted: and the three causes of gout, inflected on by Dr. Cadogan, are intemperance, indulgence, and overeat. The influence of violent mental emotions on the functions of the body is, indeed, very manifest, and more especially on the function of digestion; the disturbance of which, we have already observed, is exceedingly instrumental in the production of gout. "The first immediate effect of violent grief or vexation," says Dr Cadogan, "is to take off the action of the stomach entirely. Let us suppose a man in the best health, the highest good humour and spirits, as well as good stomach, sitting down to dinner with his friends, receives suddenly some very affecting news. Instinctly his appetite is gone, and he can neither eat nor swallow a morsel. Let the same thing happen after he has made a hearty cheerful meal, as suddenly the action of his stomach, the whole power of digestion is cut off totally, as if it were become paralytic, and what he has eaten lies a most oppressive load. Perhaps as the excess of weakness is often conviction, it may be rejected by a violent vomit, or do greater mischief: for which reason such brokes of diatheses are les hurtful received upon an empty than a full stomach." &c. (Loc. cit. p. 55.) The gouty habit, indeed, is often an irritable habit; and Sydenham observes, that a fit of gout may be called a fit of anger. (See also Van Swieten, § 1258.)

Among other exciting causes of gout, the sudden ceasing from the customary exercises and Labour is commonly mentioned, and its principal effect is probably upon the function of digestion, which is much under the influence of exercise. Indolence, in general, as contributing to induce the gouty disposition, is well understood; and the sudden cessation of activity, like all others sudden changes, is apt to produce a sudden accession of the paroxysm, in those who are predisposed to the disease. In a similar manner, a sudden change in the mode of living, the opposite to exercise, namely, from high feeding to a very spare and abstemious diet, is liable to induce the paroxysm of gout. That such a sudden abstraction of the powerful stimulus of a copious supply of food and strong liquors, must necessarily induce a considerable

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direct debility in the organs of digestion, is well understood by those who are acquainted with the laws of stimulants on the animal body. (See Debility and Excitability.) This fact, however, although sometimes deduced as an argument against the advantages of an abstinence regimen, in preventing the gout, affords no such legitimate inference. It is too obvious, indeed, to require an elaborate discussion, that all extremes, hastily adopted, are liable to derange the animal economy; and that habit alone can render extreme moderation invariably beneficial, on the one hand, and enable us to bear excess with a considerable degree of impunity on the other. Another mode of debilitating the fluid, which sometimes brings the paroxysm of gout, is excessive evacuation of any kind; such as by hemorrhage, brisk purging, vomiting, &c.; especially in aged persons, whose constitutions are already much broken down by the disease.

Sudden vicissitudes of weather, especially when connected with moisture, as from mild to cold, or from severe cold to damp and mild weather, often excite the gout; hence, Sydenham remarked, that the most frequent occurrence of the gouty paroxysm takes place in the latter end of January, and in the beginning of February. The fit may be produced either by the local application of cold and moisture to the feet, or by a general exposure to it; for such exposure, which in most people will occasion rheumatism, a catarrh, or a sore throat, will, in a gouty subject, excite a fit of the gout. In like manner, bruises or sprains of the leg or foot, or mere over-exercise of the muscles and ligaments of those parts, as in long walking, will sometimes bring on a paroxysm.

There is another alleged cause of the gout, which it would not now be necessary to mention, were it not noticed by Boerhaave, Van Swieten, and others, viz. contagion. Van Swieten considers the disease as analogous to dysestheny and other maladies, which, although originating from very obvious causes, nevertheless propagate themselves afterwards by contagion. But the stories, by which this doctrine is supported, are somewhat ridiculous: such as this, that a dog living at his master's feet during a paroxysm of the gout, suddenly ran bowling and barking round the room, Expressing the pain which he had caught from his master, whose torture at the same time became greatly alleviated, &c. (Swieten Com. ad § 155.)

Of the Diagnoses.—The attack of the regular gout is readily distinguishable from the only disease which resembles it, viz. acute rheumatism, if all the symptoms are taken into consideration. In the first place, gout is commonly a disease of advanced life; acute rheumatism is most frequent from the age of 18 to 30. Nor does rheumatism, like the gout, feize the feet in preference to the other joints, or remain for a considerable time in the same joint; but at the first attack it often attacks every joint of the body in succession, and sometimes continues for several months. The colour of the skin of the part affected in rheumatism, if it be changed, is only slightly red, whereas it becomes of a deep bright red in the gout. The pain in the rheumatism is not extremely acute, while the part is at rest, but becomes violent when it is moved only; which is not the case in the gout. And the symptoms of indigestion and disordered stomach, which precede the paroxysm of the gout, together with the marks of distention just mentioned, will serve particularly to determine the nature of the paroxysm. It must be admitted, however, there are instances of the combination of the symptoms of the two diseases, which renders it difficult to decide to which of them the individual examples belong. (Hecbergen, Comment. de Morb. p. 58.) Again, the symptoms which the irregular gout presents, are extremely numerous and proteiform, appearing frequently as dyspepsia, hydria, hypochondriasis, asthma, palpitation, syncope, vertigo, apoplexy, paralysis, &c. according to the original or acquired tendency of the constitution to those diseases. Hence the differentiation between these modifications of gout, and the disease which it mimics, is occasionally very difficult.

Of the nature or proximate cause of Gout.—This is a part of the subject upon which, if we were to confine ourselves to the communication of actual and useful knowledge, we should be altogether silent, or say but a few words. The observation, indeed, will apply to many other diseases, as well as to gout; but as gout is an affection almost exclusively occurring in the higher classes of society, among the wealthy and intelligent, it has claimed a more general attention, and become the object of more general discussion. It is greatly to be lamented, however, that the most mistaken notions have prevailed, from the earliest times, in regard to the nature and extent of the infirmity, which we are capable of obtaining, into the operations of the animal economy; and to the means by which we can obtain it. Indeed opinions as to the cause of the phenomena of health and disease, faithfully recording these phenomena, and arranging them according to their most obvious analogies, physicians have been busy in searching after their hidden causes; and, fancying a resemblance between the most dissimilar things, have succedingly called to aid the analogies of every human science, as it advanced in cultivation, to explain the phenomena of animal life. The ancient doctrines of numbers and elements, and their qualities, and the modern discoveries and suppositions of the chemical, mathematical, and mechanical philosophers, have in turn been assumed as affording the most perfect elucidation of the operations of the living body; and, as they have, of course, been in turn exploded, we need not recur to any other argument in proof of their want of foundation. By these remarks we would only to shew the futility of reasoning on the subject of proximate causes of disease, which, as we are and must remain entirely ignorant of the proximate cause of health and life, must be equally inapplicable. "Nam quae demum causa," as Celsus justly observes, "vel feudum valetudinis en praecedent, vel morbos excitant, &c. ne capiatem quidem professorum, scientia comprehensur, sed conjecturale proierentur" (De Med. Praef. lib. i.) The inquiry respecting the proximate cause of diseases is as futile as the speculations of the Cartesians to explain the essence of gravitation, and have as little to do with the advancement of true medical science, as the hypothesis of an ether affjicted Newton in his observations and calculations respecting the phenomena of that agent.

If these observations should not be sufficiently intelligible to the general reader, a brief enumeration of the hypotheses, which have been invented by medical writers, in order to explain the essential nature of gout, will probably be sufficient to prove the absurdity of such attempts. Most of the Greek and Roman physicians, with the exception of the methodists, considered the presence of a corrupted humour in the small vessels as the essential cause of gout. Hippocrates believed this humour to conflit of bile and phlegm, which flowed upon the joints. Galen followed him in supposing the defluxion upon the joints to be chiefly pituitous or phlegm, or bile mixed with phlegm. Paulus Egineta attributed the disease to a redundancy of blood, black bile, and phlegm. Trallian and Celsius imagined, that it arose from the blood itself being forced into the joints; and Ortibus affirmed that the blood in gouty people was vitiated, according to their nature of the subject.
refsembling melted glass, which remaining in the joints, produced the cretaceous matter. Arcturus, one of the most able of the Greek writers, is the only one who passés over the essential cause of the disease, a knowledge of which he allıgned to the gods alone; the evident causes, he says, are apparent to man. Themidon, Celcimus Aurellanus, and the medical fects, attributed guilt to relaxation or irritation of the parts; some, however, imputed it to the one frate, and others to the opposite. The Ancients followed closely in the path of their matters, and taught that one or other of the humours was predominant, or that they were variously combined, in cases of gout. So luminous and instructive were the doctrines of the ancients.

In the dawn of modern science, the humours were almost banished by the hypotheses of the chemists; but although we hear little more of bile, phlegm, and melancholy, or black bile, all disease was nevertheless attributed to a morbid or peculiar matter, and fakes, earth, or tarar, were deemed the immediate cause of gout and other maladies; and Paracelsus, Van Helmont, and others, are very ablrive of the ancients for promulgating fo many absurd doctrines! When the mathematical and mechanical physicians arose, they took up the hypothetical doctrines of their predecessors, and reasoned concerning the action of these supposititious humours, fakes, &c. upon mechanical principles; the chemical doctrines predominated, however, over the ancient hypotheses. Thus, to use the words of Dr. Warner, "according to Sydenham the arthritic matter consists of the putrefying heat and acidity of indigested juices: Boerhaave gives it the appellation of an acrimony or over-toughness of the liquid which waters the nervous parts: Liller makes it to be a crude and vitious forum become tchorous and corrosive: Bonnet defines it an acrimony that is invariably of the putrid, volatile: alkaline nature: Quincy says that it consists of rigid particles, such as approach near to the faline, of the nature of tartar, and not much unlike that which forms itself into concretions in the urinary passages: Cheyne in one place calls it tartarous, urinous, or other fakes: Ingram will have it to be a coagulation made by a mixture of saline particles with the oil of the adipose membrane. As every one of these writers makes the gouty matter to be an acrimony taken in with our aliment, which they call either putrid, vitious, corrosive, saline, urinous, or tartarous, so Dr. James, bane whole name needs no addition, disagreeing with them all, hath judged this acrimony to be earthy."

(See Warner on the Gout, p. 91. -- See also a feasible and learned disquisition on this topic, in "An Historical, Critical, and Practical Treatise of the Gout," by Thomas Thomson, M.D. Lond. 1742.) But such hypotheses did not die with Dr. James; for in a treatise on the gout, published in 1805, we find the following statement: "The proximate cause of gout appears to be, a peculiar saline acrimony exiiting in the blood, in such a proportion, as to irritate and excite to morbid action, the minute terminations of the arteries, in certain parts of the body." (See Observations on the Nature and Cure of Gout, &c. by James Parkinson.) a statement, which is equally indefinable, hypothetical, and practically useless, with those that have preceded it.

On reviewing these opinions of men, who have been deftively esteemed the ornament of their profession, some readers may express their surprise that such an extraordinary difference should be found among them, and that so much error (for of opposite opinions one half at least must be wrong) should exist in the science. But the only rational ground for wonder is, that so many men of sound understanding should have employed themselves in inquiries beyond the reach of their faculties, and should have imagined that, in framing hypothetical suppositions, they had acquired any actual knowledge, or had advanced one step in the practical improvement of their art. If a number of philosophers were engaged in investigating the nature of light and heat, and should not only execute a series of experiments on the reflection, refraction, and divisibility of the one, and on the properties of expansion, inflammation, vaporization, &c. of bodies, which belong to the other; but should likewise think it necessary to form conjectures relative to the nature and qualities of the sun, which is the cause or proximate cause of both; these conjectures, like the medical hypotheses just quoted, however they might amuse us, would add not a little to our knowledge, nor would the want of them be any diminution of our information, or of our practical powers.

The great source of these hypotheses, respecting the existence of a morbid humour in the gouty habit, is, no doubt, the appearance of a palpable matter, of a peculiar nature, in the joints diseased. This chalk-like matter, however, will be found to afford no ground for such a conclusion, if the circumstances are duly examined. In the first place, the production of this morbid matter may be the effect of the disease; and that it is so, is apparent from its not occurring in all cases of gout, and from its seldom or never accompanying the first attacks of the disease, but only appearing after repeated paroxysms. Nor have we any direct evidence, from experiment or observation, of the smallest difference in the blood or other humours of gouty people, from those of other persons. On the other hand, we know that the vessels in particular parts acquire the power of secreting or otherwise producing new fluids, when inflammation is induced. Thus a blow in a fleshy or membranous part shall occasion inflammation, and a considerable quantity of pus shall afterwards be accumulated or discharged, as in a common abscess; yet no one supposes that this pus was contained in the mafs of the circulating blood, any more than he supposes that urine and bile are contained in that mafs, and not elaborated by the kidneys and liver. The appearance of the chalky matter, or urate of soda, in the parts attacked by gouty inflammation, is therefore to be considered as the result of that inflammation, and not as its cause. If the general mafs of blood were contaminated with this morbid matter, or any peculiar acrimony tending to produce it, why is it never deposited on the vifera and other internal parts? Yet no such deposition was ever observed: those parts remain invariably free from it in the most inveterate forms of the gout, and the appearance of chalk-dolmes is confined exclusively to the membranous and ligamentous parts which exhibit inflammation externally. In the next place, the frequent and sudden translation of the disease from one part to another is not consistent with the supposition of its dependence on the presence of a morbid matter: but analogous changes or modifications of other inflammations, in which no peculiar matter is produced, are exceedingly common. Besides, upon the supposition of such a translation of morbid matter, its operation should be similar on every part, whereas it seems to be very different, being stimulant and exciting inflammation in the joints, but sedative and destroying the tone or energy of the stomach. Further, as Dr. Cullen justly observes, "the supposition of a morbid matter is quite superfluous; for it explains nothing, without supposing that matter to produce a change in the state of the moving powers; and a change in the state of the moving powers, produced by other causes, explains every circumstance, without the supposition of a morbid matter: and to this purpose it may be observed, that many of the causes exciting gout do not operate upon the state of
of the fluids, but directly and solely upon that of the moving powers." Dr. Cullen likewise remarks, that the supposition of a morbid humour being the cause of gout has been hitherto udesles, since it has not suggested any successful method of cure; but, on the contrary, that particular suppositions have often corrupted the practice, and have frequently led from those views, which might be useful, and from that practice which experience had approved. (First Lines, pt. 530.)

Having failed to explain the phenomena of the disease, on the supposition of a morbid condition of the fluids of the body; we might take up the doctrine of the nervous pathologists, and attempt an explanation of the symptoms, upon the notion of a derangement of the living fluid, or moving fibre, as Dr. Cullen has done. (Loc. cit. § 533–6.) But it is sufficient to peruse the account given by that celebrated physician, to be convinced that it is a mere repetition of the phenomena of the different varieties of the disease, couched in a new pharosology; and therefore that it is practically as udesle as that which he controverts. It cannot be questioned, we apprehend, in the present state of our physiological knowledge, that the prime agents in the operations of the living body, whether in health or disease, are the fluid, irritable, and moving parts; and that by these the fluids or humours are chiefly elaborated and modified: but it is likewise obvious, that the solids derive their powers from certain conditions of the circulating fluids, which are varied by respiration, nutrition, &c. Therefore the disputes between these who confine the origin of gout to the one or other part of the sytem exclusively, will be deemed frivolous. Our knowledge is necessarily limited to the phenomena of the disease, and the order in which they occur, and to the effects of physical agents upon them, as taught us by observation and experiment. "Nulla tamen adhibit oblivieux curiosi effe," says Dr. Heberden, "quam que veratur de hujus morbi causis, effectibusque, et remedii." (Comment. de Mort. Cap. 9.) But we cannot doubt that these numerous hypotheses, which have at once diverted the minds of physicians from the labour of observation, and have perverted their views of facts, have rendered the subject more obscure than it would otherwise probably have been.

Before we come to the method of treatment, there is another question to be noticed, upon which much discussion has taken place, and which has perhaps been popularly settled with considerable incorrectness: we mean the question, whether regular fits of the gout are fatalary; i.e. whether they altogether remove or prevent other complaints. The affirmative is generally maintained; and this opinion has arisen partly from observation, and partly from the hypothesis, that a paroxysm of gout confids in an effort of the constitution, by which the morbid matter is thrown off through the part affected. In a number of instances, beyond a doubt, the various symptoms of indigestion, whether affecting the stomach and bowels only, or the lungs and heart by vicinity, and the head by synpathy, are relieved or altogether carried off by the complete fit. Perhaps Dr. Heberden is scarcely correct, when he considers this relief as either, in a great measure imaginary, like that which many invalids invariably obtain from a change of their physician, or from a new medicine; or as not more frequent than similar relief from light indisposition after other violent diseases: he appeals, however, to an ample experience in support of his opinion. He thus writes: (we translate from the Latin ed. iv.) "There are some complaints in which the fit is a very frequent disease, and there this eruption is deemed fatalary. Even an ague was formerly considered by the majority of physicians as a wholesome affection, and is still so considered by some persons; its occurrence was therefore a subject of congratulation both with the patients and their friends, and every precaution was taken not to get rid of it too soon. But these notions are almost exploded in this country; and if we shall discover a remedy equally effectual for the gout, as with which we cure the diseases just mentioned, we shall at length learn with what perfect safety and advantage the gout may likewise be eradicated."—"I confes," he adds, "that I have seen some persons who rejoiced on the first attack of the gout, as if it allured to them all future happiness, and who, dreaming only of the most perfect health to come, easily persuaded themselves that this first fit had been wonderfully beneficial. This is a common disposition with mankind, as often as they have recourse to new physicians, or to remedies not before tried. But, passing by such persons, let us inquire the opinion of those, who have suffered under long and frequent paroxysms, and who are better acquainted with the disease. Of a very great number of patients whom I have seen, and whose cases I have committed to writing, more than twice as many, to say the least, have found no relief whatever from their previous complaints, in consequence of the regular fit, or have even suffered an increase of them, as have seemed to derive any benefit: and, in my opinion, the evils which were attributed to the disease, more certainly originated from that source, than the supposed advantages. Occasionally, indeed, we find that other complaints have ceased on the suppression of the gout; but the same thing also happens after acute fevers, after palsy, althama, small-pox, and inflammation, of all which I have witnessed many examples; yet no one will call these diseases fatalary. On the other hand, gout frequently occurs to persons affected with vertigo, althama, indigestion, and melancholy; where, far from alleviating these disorders, it produces a considerable aggravation of their symptoms. Besides, in some patients, all these complaints constantly accompany the paroxysm of gout, and continue during the whole of its course." (Loc. cit. p. 56.)

At all events, if we look at the life of the gouty in general, we find ultimately but little ground for congratulation. In some, it is true, the disease occurs at distant intervals, and from goes off, and therefore occasions very little, if any, obvious injury. Even epilepsy itself, when its attacks are rare, does not prevent the patient from reaching old age. But this is far from being the case frequently with either disease. In many persons whom the gout attacks, the health suffers from the time of the first fit, and gradually grows worse, until it is greatly broken, or fails altogether. It may possibly be doubted, in such cases, whether the gout caused these evils; but we are very certain that it has not been the remedy for them, nor in any way salutary.

We may justly wonder, therefore, with Dr. Heberden, how it has come to pass, that the gout is held in so much honour in England; unless it be that it is a disease, which several great men have suffered, and which chiefly attacks those happy persons who enjoy leisure and affluence, and all the good things of life. Louis XIV. of France happened to labour under a filament in the anus, and the fugitives of that time were contentedly called in by his fashionable subjects to administer relief to imaginary filament; which royal disease they persuaded themselves had attacked them: and it is probable, as Dr. Heberden observes, that in these cases of medicated waters in France, capable of producing filent, they would have been visited with the same anxiety to which our countrymen are liable to with Bathy, in the hope of returning with the gout.
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Of the Cure.—Perhaps this may be deemed an improper term for the treatment of a disease, which, on the one hand, has been affirmed to be incurable by medicine, and called the opprobrium of physicians; and, on the other, has been considered so fatal, that it ought not to be cured, and could not be cured without the most imminent danger to the patient. Nay, farther, as much trouble has been taken to produce and excite the gout, as to relieve or cure it; and all the evils which arthritis suffers, are not supposed to arise from a superabundance of gout, but because they have not had enough. It would be only justice, however, as the intelligent writer just quoted remarks, to the art of physic, no longer to call the disease its opprobrium, until the patients lay aside their prejudices and fears, and have a disposition to be cured. "Utinnam," he adds, "tam in promptu effe ineunre, quam tatum adhibere, podagre remedium." (Comment. p. 43.)

The treatment is, it is obvious, must be necessarily very different according to the different forms of the disease, the different periods of life, and the state of strength of the patient, &c. We shall first speak of the practice necessary to be pursued in the regular gout; which will resolve itself into the treatment requisite during the fit, and that which is proper during the interval.

Treatmet of the Regular Fit.—All active measures, during the occurrence of a regular paroxysm of gout, have been prescribed by writers in general since the days of Sydenham. This physician remarked, that the more violent the pain and inflammation ion, the shorter in general will be the fit, the recovery most perfect, and the interval between this and the succeeding paroxysm the longer. If this opinion were admitted as just, it would suggest the prohibition of any remedies which might moderate the inflammation. But against this doctrine another has been advanced by Dr. Cullen, which is at least equally plausible, and better supported by analogy, if not by fact; namely, that the violence of the inflammation may weaken the tone of the parts, and while it renders them less liable to similar violent attacks, and the consequent more perfect recovery, may, by that very debility, invite a return of the disease. On the whole, the indications of practice generally pursued at present, are to moderate the violence of the inflammation and febile action, when it is severe, without applying any active remedies to the foot itself. After enumerating the various external applications, such as poultices, fomentations, blisters, infusions, caustics, and stimulating substances, which have been occasionally recommended, Dr. Cullen concludes, that from any of them there is danger of rendering the gout retrograde; "and that therefore the common practice of committing the person to patience and flannel alone, is established upon the bell foundation." As there is no danger from the fit of gout, when regular, in a constitution not much broken, this method may be pursued with a certain degree of impunity; but it cannot be questioned, that the loads of flannel, which are sometimes useful, often augment the necessity for a supply of patience, by increasing the inflammation and pain in the foot. It is true, that the parts thus swelled and painful, are more acutely sensible to cold, as well as to other irritations, than in health; but no covering beyond what is sufficient to prevent a troublesome fenation of cold, if that should occur, can be necessary. (Haberden.) All poultices, fomentations, and warm bathing during the inflammatory stage are pernicious.

It is more than probable, that considerable errors have been committed, upon the hypothetical notion of keeping the gout in the extremities, at least in the younger subjects of gout, by deviations from the antiphlogistic regimen. In such fulgeæ sinuos and fermented liquors should be altogether abstained from during the fit; and the diet should consist of light aqueous and vegetable matters, or thin animal broths. The bowels should be kept open by laxative medicines, and the skin moist by diaphoretics of the neutral sorts. This is at least a palliative system, and the prejudices of men in general are averse to any more active interference with the disease. But in cases the inflammation is extremely violent, in young and hale men, Sydenham, Cullen, Huxham, and other able authorities, concur in recommending the employment of blood-letting from the arm. This, however, they do not recommend to be often repeated, on account of the debility which may ensue; and as the part affected is not an organ important to life, and the inflammation is purely local, there does not appear to be any good reason for recurring to this remedy, except in cases of extraordinary violence, in very peltorrhic habits, in which the symptomatic fever itself might prove hurtful. Local blood-letting, by means of leeches applied to the foot itself, promises more advantage, and experience itself has proved the efficacy and safety of the practice. (See Cullen, First Lines, par. 563.—Mugrave de Arbrict, regulari, cap. 8. § 4.) Cupping and scarifying the neighbouring parts have also been found beneficial. (Mugrave.)

We are persuaded that hypothesis has had much more influence than observation and experience, in exciting the general fears about interfering with the progress of the gouty inflammation, and of the danger of its being driven to some internal part by such interference. When it was believed, that a quantity of morbid matter existed in the inflamed part, it was inferred, of course, that it could only be removed by expulsion or by repulsion, in which last case it must fall upon some other organ. We know very well, that the fame hypothesis, and the same fears prevailed no long time ago with respect to cooling the skin in fevers, and especially in eruptive fevers, such as scarlet fever and small-pox. "The perspiration will be checked," said the theorist, "if you allow the skin to be cooled, and the present matter must therefore be thrown back upon the bowels, or the lungs, or the brain, and the effect may be fatal." But ample, and unvarying experience has now demonstrated, not only that such danger was altogether imaginary, but that walking the skin with cold water, even under the full eruption of scarlatina, and in the eruptive fever of small-pox, affords the most grateful relief to the patient, and is the most effectual moderator of his disease. (See Cold, effects of as a remedy.) Nor is a considerable experience of the safety and efficacy of a familiar practice, in subduing the inflammation of gout, wanting. The great Dr. Harvey himself, whose name is immortalized by the discovery of the circulation of the blood, was in the habit of immersing his foot in cold water, as soon as he perceived the approach of the gout, and thus removed the disorder; he lived to the age of eighty. Van Swieten mentions an officer of infantry, who was induced to take his gouty feet into snow, and afterwards, emboldened by successes, walked a little way barefoot upon the snow, and returned quite free from pain; the interval before another fit was also lengthened by this practice. Similar observations were likewise made by the ancients. Actius informs us, that he had been a perfon labouring under what he calls a bilious gout, "who obtained extraordinary relief from immersing and keeping his feet some time in cold water." And it is an apologium of Hippocrates, that "cold water, copiously poured upon dwellings of the joints, painful ulcers, gouty disorders, and con- vulsed limbs, lessens and removes the pain." (Aph. 25, feo. 5.—See also Haberden Comment. p. 45.—Van Swieten, Com. ad Aph. 1273.) But the most extensive evidence
of the efficacy of this practice, in curing the paroxysm of gout, has been adduced by Dr. Kinglake, (see a Difcipline on Gout, &c. Lond. 1824,) who brought forward about thirty cafes, in which the application of cold water to the inflamed part, during the gouty paroxysm, was immediately and most happily effectual in relieving the pain and removing the diseaee, without any untoward circumstance ensuing. Dr. Kinglake maintains, that the inflammation of gout is to be treated upon the same principles as other local inflammations, and yields to the same treatment. That this proposition is correct, while the constitution remains unbroken, we fully believe; but to what extent the principle will hold, in those whose health is greatly debilitated and decayed, as well by age as by frequent and protracted disease, remains as yet undetermined by experience. With the diminished strength of the patient, the paroxysms become diminished in violence, and active remedies are, therefore, the less required; but from what we have detailed above, it appears at least highly probable that, in the first attacks of gout, the application of cold, judiciously employed, so as to remove the morbid heat and no longer, would always be safe, and would contribute as well to shorten the paroxysm in the suffering of the patient, and to prevent the joints from the injury, which protracted inflammation and morbid effusions necessarily occasion.

The operation of purgatives, which is known to be essentially useful in other inflammations, has been considered as beneficial in the gout by some physicians, but has more commonly been altogether forbidden. Sydenham expresses himself very strongly in prohibition of purging, at any period of the fit, or even in the interval of health. Had he expressed his conviction upon this point simply as the result of experience, we should have been disposed to bow to his authority; but his theory appears to have had at least an equal share in producing this conviction; and unfortunately this theory involves the most gross contradiction. In the beginning of the paroxysm, we are told that there is great danger lest purgatives should drive the inflammation of the foot, "by throwing back into the mafs of blood that pessant matter, which nature was protruding to the extreme parts." (Tractat. de Podagra.) But after the termination of the fit, there is extreme danger, "lest a new paroxysm in the foot, equal severe with the former, should be produced by a purgative." (Ibid.) So that this theory blows hot and cold, like the fayre in the fable; and these dangerous purgatives drive the pessant matter out of the foot, when it happens to be in, and are the most effectual means of throwing it into the foot after it has been driven out not only from the foot, but from the whole body (according to the hypothesis) by nature!

Sydenham, however, lived long enough to retract, in part, his opinion respecting the injurious influence of purgatives in the gout, especially if the milder ones are used, and an apology given after the operation. (Dillert. de Mictu Sanguineo, &c. 1666.) Van Swieten observes, "many physicians are of opinion, that part of the gouty matter may be carried off by purgatives, and the fit rendered much more mild, especially if it be occasioned from errors in diet;" and he quotes Hofmann, who recommends gentle purgatives in all cases of local pain, and has mentioned an instance in his own person of the most striking benefit derived from a purgative taken immediately before the fit of gout. An instance has been related to us, in which the gout was completely banished, during a space of nearly twenty years, by the use of a brisk purgative, taken when the first symptoms of the fit began to appear; the medicine employed in this instance consisted principally of fennel, in the dose of about fifteen grains. We have seen this medicine used in a few cafes, with some relief, in smaller doses, and without any untoward consequences. That purgatives, as well as cold applications, may be referred to with advantage in the beginning of the paroxysm of gout, wherever the constitution is unimpaired, we consider as tolerably well established on the grounds of observation; although we do not doubt that many of the cafes of repelled gout, which have been attributed to such causes, may have really occurred, under circumstances of broken and feebile constitution, or of peculiar idiosyncrasy. But the accidents arising from a careless or injudicious abuse of any practice, afford no just argument against the rational and cautious use of it.

We apprehend, however, that many disorders have been very erroneously attributed to repulsion of the gout, which might be more correctly explained upon other grounds. For every inflammatory disease that occurred, even at the dilution of several months from the effusion of the fit, has been considered as the result of the premature cure of the gout: whereas, it is next to impossible that so long an interval could have taken place between the cause and its effect; and, on the other hand, as gout is most frequent in plethoric habits, which are also most liable to inflammatory diseases, the occurrence of pleurisy or apoplexy, in such cafes, is double to be attributed to the plethuses, and not to the previous gout. Dr. Cullen mentioned that he had known about twenty persons die suddenly, more than half of whom were of gouty habits.

The violence of the pain, in the paroxysm of gout, would naturally suggest the use of opiates; but experience has shown that opium, in any form, when administered in the beginning of any inflammatory disease, with which much heat of fkin and great fublimate excitement are connccted, generally fails to give relief; on the contrary, that it tends to increase the heat, fever, and reliefs, and, with them, the pain likewise. When, however, the violence of the paroxysm is somewhat abated, yet continues to return, so as to occasion painful and restlefs nights, opiates may then be given with safety and with advantage, especially in the cafe of persons advanced in life, and who have been often affected with the disease. The hypothetical objection to the use of opiates, that they tend "to lock up the morbid matter," is altogether groundlefs. Dr. Warner speaks with delight of the soothing influence of opium in the fits of gout, which he suffered in the latter periods of his life. (P. 135—136.)

Hitherto we have seen that the practice, generally purgative in the paroxysm of gout, is merely palliative; an actual cure being deemed a deiferitatum by molt persons, and a thing impnper to be attempted by others. Of late, however, a medicine has been introduced into this country from France, which is said to poiffes a specific power over the gouty paroxysm, which it removes "cito, tuto, et juuninde." The composition of this medicine is at present unknown, but it has been aecertained that it is a vegetable matter, and it is said by the inventor to be a plant heretofore not used in medicine. It is called "au medicinale d'Hufian." It has appeared, in many instances in which it has been employed in this country, and that in persons of the first rank and character, to poiffes the power of removing the paroxysm of gout in the course of twenty-four hours, leaving the patient in a state of good health, and in possession of the fame ufe of his limbs which he enjoyed before the fit. It is said that, in general, it increases the various excreitions considerably, if taken in the full dose, producing several loose motions from the bowels, a free perspiration, and an increased di-
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charge of urine. But the influence of the medicine on the gouty paroxysm is not attributed to these evacuations; since, in some instances, in which a smaller dose was taken, a similar relief to the gout was procured, without any increase of the excretions. No untoward circumstance whatever has yet occurred, in confinence of the speedy removal of the paroxysm: but farther experience will be requisite to enable us to form a satisfactory estimate of its properties. (See an Account of the Eau Medicinale d’Hauin, by Edwin G. Jones, M. D. Lond. 1810.)

Treatment in the Interval.—Whatever method is adopted in the treatment of the fit of gout, whether it be merely palliative, or to actuate as to shorten the attack, the constitution retains its predisposition, and is equally liable to suffer a return of the disease. It is not yet ascertained, we believe, whether the fits, when warded off by the eau medicinale, do not recur more frequently. It is the treatment of the patient in the interval of health, by which alone the disease can be cured, i.e., the paroxysms prevented from returning, and the gouty diathesis eradicated. How this is to be effected, we cannot learn from a view of the proximate cause, or essential nature of the disease; for upon this point we have no actual knowledge: but, as we possess some knowledge of the existing causes of the disease, or of the circumstances which generate or foster the predisposition to its attacks; so, by removing these, we may hope to prevent the production of that predisposition, or to diminish it, if not to remove it altogether. Now, we have seen that intemperance and indolence are the parents of the gouty diathesis, where it is not hereditary, and are the chief agents in exciting it to activity, when it is. The inference, then, is obvious: by temperance and activity, and not by medicine, the return of the gouty paroxysms is principally to be prevented.

There is, perhaps, no subject, on which Englishmen in general entertain so many unfounded prejudices, or listen to argument with so little attention or conviction, as that of temperance. It is conceived that physicians, in inculcating the advantages of it, only talk idly about it, in the way of their profession; and that what is called good living, when not carried to actual debauchery, is favourable to the support and health of the body. It is, indeed, so universally the practice, in this country, to indulge an artificial appetite, beyond the actual wants of nature, that temperance is a thing, as Dr. Cadogan observes, of which an Englishman can acquire no idea at home. It is, however, altogether comparative with respect to individual constitution; for some persons will become plethoric to a morbid degree, upon a diet which is barely sufficient to support life in others. Perhaps Dr. Cadogan’s tale is correct. “As long as a man eats and drinks no more than his stomach calls for;” (i.e. when unexcited by variety of dishes, by sauces and condiments, or by interpolating liquor of any kind;) “and will bear without the least pain, disfellation, or uneasiness of any kind, &c. he may be said to live in a very prudent well-regulated state of temperance, that will probably preserve him in health and spirits to great old age.”

(On the Gout, p. 31.)

We know too well, however, the general want of power or inclination to refit the pleasures of the table, with that degree of perseverance and to the requisite extent, to expect that many cures of the gout will be effected in this way; but this we may assert, that the only influences of the eradication of the disease, which are known, have been accomplished by rigid and persevering temperance. Dr. James Gregory, the present professor of medicine in the uni-

versity of Edinburgh, is a remarkable example of the perfect cure of the gout by such means. Born of gouty parents, he was attacked severely when young, and suffered several paroxysms, which, after being banished by abstinence living, recurred on a short indulgence in revisiting Oxford; but he has since that time entirely kept the fast at a distance for about thirty years, by extreme temperance and much exercise, and is now hale and strong, though advanced several years beyond the age at which his father died, broken down by the gout. This he repeats annually to his pupils with no small exultation. His diet has been chiefly broth, or a sparing quantity of plain animal food, with little or no wine. Dr. Cadogan affords another instance of the benefit of rigid temperance, in his own person, “having not only got rid of the gout,” he says, “of which I had severe fits in my younger days, but also emerged from the hallowed ebb of life, that a man could possibly be reduced to by coffee, jaundice, and a complication of complaints, and recovered to perfect health, which I have now uninterruptedly enjoyed above ten years.” (Loc. cit. p. 83.)

Dr. Heberden likewise observes, that although complete cures of the gout are extremely rare, yet he has known more than one instance in which, by a total abstinence from animal food and wine, the patients were relieved from a state of extreme debility and misery, to such a degree of health and strength, as rendered their life no longer unsatisfactory to others, nor painful to themselves. Comm. p. 44.

It can scarcely be doubted, indeed, that a complete cure of the disease might, by a rigid plan of life, be accomplished in most cases, when the patients are not above the age of 30 or 35 years, even if they should have already experienced two or three paroxysms. In older habits, where the disease is of longer standing, a complete cure cannot be so confidently expected; but experience has shown that the feverity and the consequent evils of the disease may be actually mitigated by temperance, even under such circumstances. It is a milder, less distressing, and a more disease of the body to indulge an artificial appetite, beyond the actual wants of nature, that temperance is a thing, as Dr. Cadogan observes, of which an Englishman can acquire no idea at home. It is, however, altogether comparative with respect to individual constitution; for some persons will become plethoric to a morbid degree, upon a diet which is barely sufficient to support life in others. Perhaps Dr. Cadogan’s tale is correct. “As long as a man eats and drinks no more than his stomach calls for;” (i.e. when unexcited by variety of dishes, by sauces and condiments, or by interpolating liquor of any kind;) “and will bear without the least pain, disfellation, or uneasiness of any kind, &c. he may be said to live in a very prudent well-regulated state of temperance, that will probably preserve him in health and spirits to great old age.”

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both by the assistance of others, which may be given him in the following manner: let a handy active servant or two be employed to rub him all over, as he lies in bed, with flannels, or flannel gloves, fumigated with gums and frises, which will contribute greatly to brace and strengthen his nerves and fibres, and move his blood without any fatigue to himself. This may take up from five to ten minutes at first, but must be repeated five or six times a day, supposing him totally unable to help himself. But if he can walk a hundred yards only, it will forward him greatly to walk those hundred yards every two hours; and if he can bear a carriage, let him go out in it every day, till he begins to be tired. The first day or two all this may disturb and fatigue him a little; but if he has patience to persevere to the fourth, I dare promise him some amendment and increase of strength; which he must employ, as young merchants do a little money, to get a little more. Thus he must go on rubbing, walking, and riding a little more and more every day, slopping always on the first sensation of weariness to rest a little, till he be able to walk two or three miles at a stretch, or ride ten without any weariness at all. He must ever remember that the habit of body is only to be corrected by habitual measures; and perseverance, therefore, must be his motto in regard to exercise, not less than with respect to temperance. But it must be observed, in general, that the exercise should not be violent; for if violent, it cannot be long continued, and must always endanger the production of atony and debility in proportion to the degree of violence. It must be moderate;" to use the words of Dr. Cullen, "but at the same time coniant, and continued through life."

It has been supposed by some persons, that an abstemious and active mode of life for a limited time, as for instance, an abstinence from animal food and fermented liquors, and a diet of milk and farinaceous matters alone, for the space of one year, might be sufficient for a radical cure of the gout. Such an opinion was expressed by Celsus, who says that "sine, by cleaning themselves thoroughly by drinking saes' milk, have for ever nulplied the disease; and others, by abstinence, during a whole year, from wine, mulik, and venery, have obtained a security from it for the remainder of their lives." (De Medicina, lib. ii. cap. 22.) In a few cafes, the plan possibly have succeeded; but it is well known that many persons, who, by entering on an abstemious course, had been delivered from the gout, have, on returning to their former mode of living, had the disease return with at least equal violence.

While an abstemious regimen, combined with exercise, will tend to correct the gouty habit, if steadily pursued; it will be at the same time advisable to avoid as much as possible some of those circumstances, which we have mentioned above as among the frequent exciting causes of the disease; more especially when the gouty habit has been established by a repetition of the fits, or is hereditary in its origin. In such cases, the measures, which we have proposed, are not easily pursued to the requisite extent, and are commonly attempted even with reluctance; men, therefore, have been very desirous to find a medicine which might answer the purpose, without requiring a restraint on their manner of living. Of this there are many empirical and self-interested pretended physicians have taken advantage, and have been induced either to abuse the gouty, in fact, or have rashly employed those of the most pernicious tendency. It is unnecessary for us to inquire into the nature of those alleged mustard, etc., nostrums, which, after being for some time in vogue, were neglected or exploded, as their inutility or injurious qualities were thus acknowledged. But after promising that we are much disposed, with Dr. Cullen and others, to believe the impossibility of curing the gouty habit by medicines, we shall notice one or two known medicines, which have been in vogue so long time ago. If the gouty constitution is created by a series of high-fevering and indolence, how is it to be expected that medicine can change that constitution, especially while the cause continues to operate?

The Portland powder is a medicine which obtained considerable reputation, as a cure for the gout, about the middle of the last century. This powder derived its name from the duke of Portland, who received so much relief from it, that he ordered the formula to be printed, and delivered to all who should ask for it. It was brought from Switzerland by a friend of the duke's. The powder consists of the roots of arctiologia rotundata and gentian, and of the tops and leaves of germander, ground-plum, and consinry, well dried and powdered, equal weights. This powder was ordered to be taken for a year or two, at first in the dose of a dram daily, but afterwards in smaller quantities. (See Weisse, p. 17.) In the work just referred to, Dr. Ckphere has shown that a similar compositon was used by the ancients for the cure of gout. Such a formula is given by Galen, in his treatise De Antidotis, lib. ii. cap. 15., which he says he had used himself. Celsus Aurelianus speaks of similar medicines, under the denomination of annella medicinae, from their being taken for the space of a year. Actius gives, among other gout medicines, an "antidotus podagrica ex doubius cantarese generiosis," which differs from the Portland powder in one ingredient only. But several of the ancients concerned the long uninterrupted use of these medicines as dangerous; and allure us that they are extremely hurtful in the hot and bilious, and are only proper in cold and phlegmatic constitutions. The Portland powder has fallen into neglect, under a notion that it was ultimately prejudicial. "In every instance," says Dr. Cullen, "which I have known of its exhibition for the length of time prescribed, the persons who had taken it were indeed afterwards free from any inflammatory affection of the joints but they were affected with many symptoms of the atomic gout; and after some time finishing their course of medicine, have been attacked with apoplexy, atheroma, or dropsy, which proved fatal." (First Lines, par. 557.) Dr. Heberden, however, is of opinion, that the popular prejudices against this medicine at present are as far beyond the truth, as they formerly were in its favour. (Comment. p. 48.) He attributed to it considerable powers of alleviating the difeafe, by strengthening the stomach and supporting the function of digestion; and believes that many of the evils (which, because they followed its exhibition, were imputed to its operation,) were in reality the consequences of the difeafe, and not of the remedy. That those cafes, however, of apoplexy, &c., which it is admitted, occur in gouty habits, would be probably accelerated, if not occasioned, by the use of a hemorrhagic powder, while the full diet was continued, appears to be extremely probable; for the plethora must have been increased in proportion to the artificial increase of the digestive powers. We should, therefore, be disposed to conclude, that the constant use of such a medicine must be pernicious, unless it were combined with temperance in eating and drinking; and that, with such a regimen, it would in all probability be highly beneficial, if taken whenever the symptoms of indigestion should appear.

Another class of remedies has been employed in the interval between the paroxysms of gout, and in many instances with considerable alleviation to the disease, rendering the
the fits milder, and the intervals between them longer; we allude to the antacids; such as the alkalis, and absorbent earths. The nature of the chalky matter, produced in invertebrate gout, which is an acid, and denominated lithic or uric acid, (being the same which is found in the urine and urinary concretions,) has led to the theory, that this acid, or its elements, is the specific humour of the gouty; and therefore naturally suggested the idea of using alkaline medicines as remedies for the disease. And as accentuant drugs are found to increase the gouty diathesis, and to increase the disordered state of the digestive organs; to alkaline medicines we have been made to relieve the symptoms of indigestion, and at the same time to lessen the disposition to gout. Thus the caustic alkalis have been found beneficial; but not more so, we believe, than the mild or carbonated alkalis, especially potash; and the absorbent or alkaline earths have likewise afforded relief; and sometimes speedily removed some of the urgent symptoms of disordered stomatch; especially the preparations of chalk, lime-water, and magnesia. The magnesia is perhaps one of the best medicines of this fort for the gouty, as it not only corrects the acidity of the stomatch, but at the same time is laxative to the bowels, and thus contributes to obviate phlethora. When these antacids do not sufficiently open the bowels, or do not prevent colic, a little rhubarb, aloe, or some other aromatic purgative should be added. Thus, Mr. Home and Mr. Brande, in experiments made on the Philosophical Transactions, (Part I. for 1810) that magnesia has a much more powerful influence in preventing the formation of the uric acid, in the urine, than of the alkalis; it is probable, therefore, that they may be more beneficial in the gout. As a warm laxative the tincture of guaiacum was much recommended, and as it combines a stimulant with an evacuant property, it may be serviceable in some conditions.

Care of the irregular Gout.—We have already remarked, that false theory has led to much false alarm, and doubled to many mistakes in practice, especially relative to the atomic gout; all the various symptoms of dysepspsia, and hypochoonrialists being often supposed to be gouty, when no actual gout had ever appeared. Hence fomentations, blisters, rubefacients, and other local stimulants to the extremities, the Bath waters, hot podlavia, &c. have been employed to bring on the gout in the foot, instead of relying on the remedies which might rectify the functions of the digestive organs. The Bath waters are certainly to be recommended in those cases, as they are possessed of considerable powers in restoring the healthful condition of the stomatch, especially when it has been disordered by irregular and intemperate living; and of relieving those wandering pains, which are deemed gouty, but which, as Dr. Heberden observes, are the common accompaniments of declining years and a broken constitution.

In these cases of atomic or wandering gout, as it is called, all the means usually employed to strengthen the habit in general, and the stomatch in particular, are to be resorted to. Moderate, but frequent and regular exercise on horseback, or walking, must be pursued; the diet should be a little more generous, and some wine may be necessary; but both food and drink of the accepet kind must be measured, and if wine, of whatever sort, must be found to increase the acidity of the stomach, spirits much diluted with water should be administered. At the same time, for the purpose of supporting the tone of the stomach, preparations of iron, the Peruvian bark, bitters, and aromatics in moderation may be resorted to; and laxatives, employed only so as to prevent colic, must be taken. The propriety of frequent gastric vomits, where the indigestion is troublesome, is more than questionable; for, while they give a temporary relief, by removing a load of undigested food, they tend to debilitate the organ, and thus to increase the evil which they were intended to remove. At the same time, all the causes of debility formerly mentioned, must be snuffed, and exposure to cold especially must be carefully avoided: the most certain means of doing this is by repairing to a warm climate during the winter season.

Care of misplaced or retrocedent Gout.—These, like the atomic gout, are in a considerable degree the fruits of medi- cal speculation, more especially the misplaced gout; they do, we believe, occasionally occur in cases of old and inver- terate gout, but certainly much more rarely than is generally believed. This opinion Dr. Heberden rates from his own experience. (Comment p. 41.—See also "Letters on the Caufe and Treatment of Gout," by Dr. Robert Hamilton, Lynn, 1820.) The last-mentioned physician, who had employed bleeding and other antiphlogistic remedies, both upon himself and several of his friends for eighteen years, never saw any thing like a retrocedence of gout; and Dr. Gulien never saw an influence of misplaced gout.

When the gout has disappeared in the extremities, the stomatch and bowels are sometimes attacked with most acute pains, which is of a spasmatic nature, and to be relieved by thirst, and the employment of strong, diluting, and antacids, fluids, such as wine, or even opium in full doses. Opiums are doubtless the most effectual antiphlogistic medicines; but their operation will be aided by combining with them the others, volatile alkali, the free use of strong wines, and aromatics, given warm, or ardent spirits, if there be not effectual. Camphor, mufk, asafetida, and other strong smelling substanccs, may be employed as adjuvants, especially in lef violent cases. External heat to the region of the stomatch, hot podlavia, or the warm bath, will contribute by their stimulant powers to overcome the spasm, and pain. If the stomatch is known to be loaded, as by a previous repast, its contents may be evacuated upwards, by draughts of warm water, with wine, or of chamomile tea, or downwards by means of some of the cathartic tinctures, as of fennel, or rhubarb.

As those persons, who are subject to paroxysms of the gout, are generally pellitory in their habits, so they are liable to inflammatory diatheses; and it cannot be doubted, that ordinary attacks of inflammation of the lungs, of palsy, and apoplexy, have been deemed gouty, and have proved fatal from the omission of blood-letting. When the symptoms of pleurisy, or periiuemousness, or the acute pains of head, vertigo, somnolency, threatening apoplexy, or the actual symptoms of apoplexy and palsy occur; we ought not to delay the exhibition of the usual remedies for those diatheses, or be induced to be sparing in the use of the lancet, because we apprehend a gouty diathesis; for death may be produced in a few minutes. And, as Dr. Heberden judiciously observes, "where the danger is imminent, from the violence of the symptoms, and we are doubtful whether they be gouty or inflammatory, we incur much greater risk by omitting blood-letting in a diathesis arising from inflammation, than by drawing blood in a disease arising from gout." Indeed those very physicians, who condemn bleeding and other evacuations in gout, in the extremities gravely prescribe the prompt administration of those remedies, when the lungs, head, or other viscera are attacked with it. In a word, when the internal viscera are affected with unequal or violent symptoms of inflammation, the same treatment by local and general evacuation, blistering, &c. must be resorted to; and in all other cases of inflammation, regard being had at the same time (an ob- servation, indeed, which applies to the practice of medicine universally)
universally) to the peculiar circumstances of the patient's age, strength, and constitution.

GOUT, in Botany. See Angelica.

GOUTIER, Gouye, or Goutre, terms in Surgery, applied to a chronic enlargement of the thyroid gland. See Bronchocele and Goitre.

GOUTY-LAND, in Agriculture, a term used by the farmers to denote a hollow fuzzy black earth, with little springs, that have no free outlet, and therefore swell and elevate the surface in many places.

GOUVEA, in Geography, a town of Portugal, in Estremadura; 20 miles S.E. of Viseu.

GOUX DE LA BOULAYE, Francis E.B., in Biography, a celebrated traveller, was born in the province of Anjou about the year 1616. Little is known of his early life, but that he felt a strong propensity for rambling into foreign countries; he employed ten years successively in traversing various parts of the globe. He seems to have been willing to become all things to all men, in order to obtain his wishes in safety. In Africa and many parts of Asia he passed for a Mahometan, and in Europe he was a good Catholic. On his return, he published an account of his travels, under the title of "Les Voyages des Observations de François de la Boulaye le Goux, en divers Pays, d'Europe, d'Asie, et d'Amérique, jusqu'à l'année 1650." This work was published in 1650 and illustrated and adorned with engravings. The style is incorrect, but the facts, as far as they are borne out with truth, are said to be very curious. He was so much altered in his person during his absence from France, that his mother even, either could not, or would not recognize him, and he was obliged to institute a law-suit to establish his rights as heir in the family. In 1658 he was appointed ambassador to the Porte and the great Mogul, by Lewis XIV, and was very dilettante in renewing his commerce with the East. Le Boulaye died in Perou of a fever before he had executed this mission. Morel.

GOUYE, Thomas, was born at Dieppe in the year 1650. He was brought up among the Jefuits, and was at an early period distinguished by an ardent love for mathematical and scientific pursuits. In 1699 he was elected a member of the Royal Academy of Sciences at Paris, of which body he became an affluential attendant, and was highly esteemed for the useful contributions which he made to their memoirs. He died at Paris in 1723, leaving behind him, as memorials of his learning and industry, "Physical and Mathematical Observations tending to the Improvement of Astronomy and Geography, sent from Siam to the Academy of Sciences at Paris, by the Jefuit Missionaries, with Reflections and Notes, in two volumes." The first volume was published in 1688, the second in 1692, and both have been added to the seventh volume of the collections of the Academy. Morel.

GOW, in Geography, a town of Hindoostan, in Bahar; 40 miles S.S.W. of Bahar. N. lat. 25°; E. long. 83° 48'.

GOWER, John, in Biography, an ancient English poet of the fourteenth century, is said to have been descended from a family at Sittemham in Yorkshire. He had the best education which the times afforded, and at a proper age became a member of the Society of the Inner Temple, where he attained to a high degree of respectability in the profession of the law, and where he became acquainted with Chaucer. Some writers affirm that, in the course of his professional duties he was appointed chief justice of the court of Common Pleas, though others think the judge was another person of the same name who was a contemporary with the poet. Gower attached himself to the duke of Gloucester, uncle to Richard II., and was much noticed by the king himself, at whose desire he wrote his principal work. He had, however, a pliable mind, and could turn his pen to different interests; for on the accession of Henry IV. he not only wrote in adulatory terms to the new king, but even reflected on the misgovernment of the one who had been deposed, and who had been his patron. His circumstances were such as to put him beyond the fear of want, for he appears to have been a liberal contributor to the rebuilding of the church of St. Mary Overy in Southwark. During the first year of Henry's reign, our poet had the misfortune to be deprived of his sight, an affliction which he did not long survive. He died in the year 1422, at a very advanced age. Gower, says his biographer, is entitled to a place among English writers only relatively to the time in which he flourished; for though well versed in learning, and a successful cultivator of his native language, he has not the least pretensions to genius or invention. He is characterized by his friend Chaucer, as the "moral Gower;" he was uniformly grave, even upon topics that might inspire vivacity. He was author of three volumes, entitled "Speculum Meditationis;" " Vox Clamantis;" and "Confessio Amantis." Of these, the first is a moral tract, and relates to conjugal duties; the second is a metrical chronicle concerning the insurrection of the people under Richard II., in Latin elegiac verse; the third, or "Lover's Confections," relates to the morals and metaphysics of love. This is the only one that has been printed, and it was among the earliest products of the English press, by Caxton in 1483. It seems, says Mr. Warton, to have been his object to crowd all his erudition into this elaborate performance. The most interesting part of the work is a variety of stories added as moral examples, and taken from authors most in vogue, ancient and modern. The language is periphrastic, and the verification frequently harmonious. Biog. Brit. Warton.

GOWER, in Geography, a district of W.Wes, in the south-western extremity of Glamorganshire, below the town of Swansea, and bounded by the Irish sea and the Bristol channel.

GOWER, Cape, a cape on the E. coast of China, lying in the track from the southward to the gulf of Pekin. A reef of rocks runs out from a neck of land near this cape, which appeared to have a compact harbour. The entrance to it was between the cape and the reef just mentioned. When the perils concerned in the embay to China passed this cape, a considerable number of vessels were lost in the harbour, and a pretty large town behind it. N. lat. 36° 57'. E. long. 122° 15'.

GOWER'S ISLAND, a small, flat, low island, in the Pacific ocean, so called by captain Carteret, who passed it in Aug. 1767; he found no anchorage, and could only obtain a few cocoa-nuts in exchange for nails; the inhabitants resented the theft of Egmont isle. S. lat. 7° 50'. E. long. 158° 50'.

GOWER'S HARBOUR, a bay on the S. W. coast of New Ireland; 2 miles N. of Cape St. George. M. Bougainville calls this "Prafalin Bay," and by Dampier it is called "St. George's bay." S. lat. 4° 50'. E. long. 150° 48'.

GOWGAT, a town of Hindoostan; 12 miles W. of Agra.

GOWGATCHY, a town of Bengal; 12 miles N. of Calcutta.

GOWN, Rone, a long upper garment, worn by ladies, divines, and other graduates, who are hence called gownsman of the gown, or gown-man.

The gowne is an ample sort of garment, worn over the ordinary
ordinary clothes, hanging down to the feet. It is fashioned differently for ecclesiastics, and for laymen.

At Rome, they give the name virile gown, togas viriles, to a plain kind of gown, which their youth affumed when arrived at puberty. This they particularly denominated pluvius.

In some universities, physicians wear the scarlet gown. In the Sorbonne, the doctors are always in gowns and caps.

Beadles, &c. wear gowns of two colours.

Among the French officers, &c. they distinguish those of the short gown, or robe, which are such as have not been regularly examined. They have also barbers of the short gown, who are such as are obliged to pluck in an inferior way to barbers, or those of the long robe, in the general, for the civil magistrature, or the profession opposite to that of arms.

In this sense it was that Cicero said, "Cedant arma togae."

GOWRAH, in Geography, a town of Bengal; 27 miles S. S. E. of Dacca.—Also, a town of Hindostan; 5 miles N. E. of Benares.

GOWRAN, a poilt town of Ireland, in the county of Kilkenny. It is a place at present of no importance, but was a borough before the Union, and there are some ruins which seem to intimate its former importance. It is 52 miles S. from Dublin.

GOWREY, a town of Hindostan, in Oude; 53 miles W. of Kaisarabad.

GOWRY-Bray, in Ornithology, a name given by Edwards to the Loma sanctuloria.

GOWRYPOUR, in Geography, a town of Bengal; 26 miles S. E. of Dacca.

GOWT, in Engineering, or go-out, is a name applied to the finnish ridge, or valley used when embankments next the bank in rivers, is allowed for, to lower the land-waters when the tide is out, and preventing the ingreets of salt-water. Some of the gowns in the feast of Lincolnshire and Cambridgeshire are very large works, and cofl immense sums of money.

GÖY, in Geography. See ASCO.

GOYANCES, a town of Spain, in Galicia, on the sea-coast; 25 miles S. W. of Santiago. N. lat. 42° 32'. W. long. 8° 50'.

GOYAS, GOJAS, or GOYES, a town and government of Brazil, extending from 42 to 54° W. long. and from 6° 30' to 19 S. lat. the inhabitants of which are estimated at 89,530 whites, 29,659 Indians, and 34,100 negroes, who are employed in searching for gold in the mines, which were discovered in the year 1726.

GOYAVA, a town on the W. coast of the island of Grenada. N. lat. 12° 13'. W. long. 61° 31'.

GOYAVES, a town of the island of Guadaloupe, giving name to a bay in which it is situated.

GOYEN, JOHNS VAN, in Biography, a painter, born at Leyden, 1596, who studied successfully the practice of landscape-painting under several masters, and having an uncommon readiness and skilfulness of hand, he produced a great many works of a light agreeable kind; with much character of nature, but no great relish of art; which, in their time, however, were very highly esteemed and widely spread over Europe.

Views of he scenes on the banks of the canals and rivers of the Low Countries were his favourite studies; sometimes he emerged to the sea shore, or sunk into the interior of the country, and sketched the villages that presented themselves to his tatte in the one, or the harbours, &c. of the other; but all are touched by the same kind of pencilling, and generally in the same hue of colour, when he came to work them up into pictures. Certainly, they have much merit of a peculiar kind, such as lightness in the handling, and freedom in their effect; but frequently they are rapid and flimsy, and by no means justify the high value and reputation affixed to them. It is said that the grey tone, too frequently found in his pictures, arose from the use he made of Haerlem blue, which is apt to fade into that tint, and therefore no longer in use. It may be so; but that grey is not the predominant defect in his pictures; it is the evident fault with which they are wrought, and their consequent imperfection of imitation, that induces us thus to condemn what the world have too long estimated in a high ratio, which ought only to be given to works completed with the skill and purity of talle of a Caracci or a Claude. He died in 1656, aged 60.

GOZ, or GOZEN, in Geography, a sea-port town of Morocco, on the coast of the Atlantic, in the vicinity of Mogador.

GOZO, an island of the Mediterranean, situated N. W. of Malta, and at a little distance from it. This island is about 25 miles in circumference, rather fertile, and containing about 5000 inhabitants.

Gozzi, or Gajda, a small island in the Mediterranean, about 27 miles from the S. W. coast of Carthaca; anciently "Clauda," near which St. Paul sailed in his voyage to Rome. Some biblical writers suppose that the Gozo near the site of Malta is the Cladus of the Book of Acts. It is occupied by about 30 families; who have a Greek church, and is occasionally visited by vessels for a supply of water and provisions. At a small distance to the west is a very little island called "Pulo Gozo," or Little Goz. N. lat. 34° 48'. E. long. 23° 46'. See GOZZANO.

GOZZANO, a town of Italy, in the department of the Guglia; 18 miles N. of Novara.

GOZZOLI, BENOZZO, in Biography, one of the early practitioners of the art of painting on its revival. He was a Florentine, and disciple of Fra Angelico; but subsequently imitated with very great success the style of Masaccio, his contemporary. Valfari speaks of him with great esteem under the name of Bonozo, and relates histories of his many productions at Florence, Volterra, Rome, and Pisa; at which latter place are his most conspicuous labours, both in history and portraits, which indeed at that time were usually introduced in historical pictures. At Pisa he died in 1478, aged 78, and a monument, with a Latin epitaph, is placed near his principal work in the Campo-Santo; a monument of his powers, and the esteem in which they were held.

GRAAF, REINIER DE, an excellent physician, was born at Schoonhoven, a town in Holland, where his father was an eminent architect; on the 30th of July, 1641. He studied physic at Leyden, where he made great progress, and at the age of 22, published his treatise "De Sterco Pandreatico," which gained him considerable reputation. In 1665, he went to France, and received the degree of M. D. at Angers, but he returned to Holland in the following year, and settled at Delft, where his great success in practice excited the envy of his professional brethren. He married in 1673, and died in Augst, 1673, when he was only 32 years of age. He published three dissertations relative to the organs of generation in both sexes, upon which he had a controversy with Swammerdam. His works were published in 1668. At Leyden, in 1667 and 1705; they were also translated into Flemish, and published at Amsterdam in 1686. Houtchinson, Biol. Med. Eloy.

GRAAF KEYSET, in Geography, a district of southern Africa,
Africa, in the colony of the Cape of Good Hope, extending to the easterly extremity of the colony. On the E. it is divided from the Kafris by the Great Fish river, the Turky, the Bamburgh, and the Zuureberg; on the W. from the districts of Zwentendam and Stellenhof by the Cangoos river, the Gunka or Lion’s river, and Nieuwland mountains; on the N. from the Bosjesman Hottonutos by Plattnberg Landmark, the great Table mountain, and the Karreeberg; and on the S. it is terminated by the peace; the whole length and breadth of this district may be about 250 by 100 miles, making an area of 150,000 square miles, which is peopled by about 750 families, each family commanding about 57 square miles of territory. Great part of it has been occasionally abandoned on account of the incursions of the Kafris and Bosjesmen. The inhabitants are a sort of Nomades, who would long ago have penetrated with their flocks and herds far beyond the present boundaries of the colony, if they had not been resisted by the Kafris. The hours of this district are graziers; and it is entirely composed of sheep-farms, which were grants made to the original settlers of certain portions of land to be held on reasonable yearly leases, on condition of paying to government an annual rent of 24 rix-dollars. Barrow’s Travels in S. Africa, vol. ii. 1 GRAAT, or GRAAF BARENT, in Biography, an historical painter, whose name is remembered principally upon account of his close imitation of the works of Bambocci, and of his having founded an academy at Amsterdam, where he was born, to which the best artists of his time resorted to study after living models; by which means much improvement was obtained, and spread among those who cultivated taste and science in the arts. He died in 1709, aged 81. 2 GRAB, in Geography, a town of Bohemia, in the circle of Leitmeritz; 17 miles W. N. W. of Leitmeritz. 3 GRABARCIJ, GRABERT, in Church Antiquity, such persons as deferred the receiving of baptism till the hour of death; or who did not receive it till they were dangerously ill, and out of hopes of life; from an opinion, that baptism absolutely washed away all former sins. The word is formed of grafa, bed; and that from the Greek ἱππα, a hanging bed, of κύπευ, I suspend; such as was the bed of slaves, poor people, Cynic philosophers, &c. who are enemies of luxury and ease. 4 GRABAU, in Geography, a town of the duchy of Warsaw; 12 miles S. of Kalisz. 5 GRABAW, a town of Austrian Poland, in the palatinate of Belz; 28 miles N. W. of Belz. 6 GRABE, JOHN ERNST, in Biography, a learned divine, and editor of the Alexandrian manuscript, in the Royal Library at London, was born at Konningberg, in Prussia, in the year 1666. Here he received his education, and in due time took his degree of M. A. applying himself with all diligence to the study of divinity, and the pavement of the fathers. He had been brought up in the Lutheran principles, but having imbibed some notions inconsistent with the commonly received faith, respecting the uninterrupted succession of bishops being essential to the existence of the true church, he was summoned before his superiors and imprisoned. Upon his release, after a few months, he chose rather to quit the church than abandon his opinion, and determined to become a member of the Catholic religion. He delivered, in a memorial to the ecclesiastical college at Sambia, in Prussia, in 1679, containing the reasons for his change, and then left Konningberg, that he might be at liberty to carry his plan into execution, in some place where he should be beyond the reach of the Prussian jurisdiction. While he was on the road to Erfurt, through which he meant to pass to a Catholic country, the elector of Brandenburg sent three tracts to him in answer to his memorial, by three Prussian divines, written by order of the elector. This great attention of his sovereign claimed the respect of Grabe, who not only read them with care, but felt defects of disfiguring the question more closely before he formed his ultimate determination of abandoning the religion in which he had been educated. He accordingly wrote to one of the persons that had answered his memorial, intimating a design with to return to Berlin, that he might enjoy the benefit of a conference with him. This privilege was obtained for him; M. Grabe returned and was soon prevailed on to relinquish his purpose of joining the papal communion, but still he maintained the obstinate tenet for which he had suffered imprisonment. Finding him insurmountable on this point, his friend advised him to remove to England, where, said he, “you will find the outward and uninterrupted succession which you want; take then your route thither: this step will cause less uneasiness to your friends, and, at the same time, equally satisfy your scruples.” He gladly complied with the advice, and was strongly recommended to King William, who immediately granted him a pension of 100l. per ann. to enable him to pursue his studies. From this time he considered England as his country, because he conceived that its ecclesiastical constitution approached nearer on the whole, than that of any other, to the primitive pattern. He showed his gratitude for the liberal patronage which he received by the publication of several learned works. Having formed a design of printing some curious and scarce pieces of the fathers, in defence of his own opinions, he obtained access to the university of Oxford, to examine the treasures of the Bodleian library; and, in 1698, he published “Scripturum S. S. Patrum, &c.” vol. i. and in the following year, the second volume of the same work appeared. Shortly after this, he was ordained a deacon of the church of England, and was appointed chaplain of Christ-church, Oxford. This promotion he accepted, in order that he might be entitled to the emoluments without being required to discharge the duties of the appointment, for he had refrained, on his ordination, to receive the sacrament, on account of the omission of the prayer in the communion service, mentioning the sacrifice, before the elements were distributed, which had been inserted in the first common-prayer book of King Edward VI, and he ever afterwards continued a non-conformist in this particular. In the same year in which he took orders, Mr. Grabe published “S. Iustini Philosophi et Martyris Apologia Prima pro Christianis, &c.” illustrated with the notes of several learned men, and additional remarks of his own; and in 1702 he published “S. Ioannis Episcopi Lugdunensis contra omnes Harectos Libri quinque, &c.” with preface and notes. On the accession of Queen Anne to the throne, Mr. Grabe’s pension was continued, and her majesty was advised to employ him in printing the Alexandrian MS. in the royal library, of the Septuagint translation of the Old Testament. The queen took the opportunity of informing him of the appointment herself, and at the same time made him a handsome present as an encouragement to his exertions. In 1705, he published proposals for printing that work by subscription, setting so fair a superior value of this copy to the Vatican MS.; he also gave three specimens, containing so many different methods for the projected edition, in the final choice of which he was to be determined by the learned world. As a testimony of their approbation of the design, the university of Oxford pre-
fected him with the degree of doctor of divinity. His proposals met with a very favourable reception on the continent as well as in England, and he received a handsome present from his own sovereign, the king of Prussia, and liberal subscriptions from the principal nobility, clergy, and gentry of all parts. In 1707, he gave to the public his first volume, under the title of "Vetus Testamenti latina Septuaginta ab Appii Apollonii Septuaginta," which was published in 1709. This volume contains the Pentateuch, and the three following books. In the expectation of an accession of additional MSS. he deferred the second and third volumes, and published the fourth volume in the year 1709. This contained the book of Psalms, of Job, of the three books of Solomon, &c.; and in the following year he published a Latin dissertation, giving a particular account of the reasons why he had departed from the usual order of publication, and of the help which he expected to receive in order to perfect his plan. These were, a Syriac MS. of the historical books of the Old Testament, with Origen's remarks upon them, and two MSS. one belonging to cardinal Chigi, and the other to the college of Lewis XIV. When he received these MSS. and had collated them, he prepared a volume of annotations on the whole work, and collected materials for the Prolegomena. The time which these objects took, caused a material delay in the publication of the second and third volumes, which did not, in fact, appear till after the author's death. This event took place in 1712, when he was in the forty-fifth year of his age. He had previously to this published "An Essay upon the Arabic MSS. in the Bodleian library, and that ancient book, called the Doctrine of the Apollonius, which is said to be extant in them, wherein Mr. Whitton's mistakes about both are plainly proved." The third volume of his great work was published in 1719, and the fourth in 1720. On his deathbed he was attended by Dr. Smallridge, by whose means he declared that the public might be informed that he died in the faith and communion of the church of England, though he considered its constitution to be defective in some points, in which he thought the nonjuror clergy adhered more closely to the apostolical doctrine and discipline. Of his talents there were different opinions, but of his industry and learning no one could harbour a doubt. Dr. Thirlby says, in the dedication of his edition of Julian's Apology, "he was a good man, and not unlearned, and well versed in the writings of the fathers. But he was no critic, nor could be one, since he was not furnished with genius or judgment, or, to speak the truth, in learning was only sufficient for the purpose." In this opinion Le Clerc coincides, and adds, that his books gained him the character of a laborious person rather than that of a great critic. He was the author of many other works besides those which have been mentioned, and was editor of an elegant edition of bishop Bull's works; he likewise assisted in preparing for the prebend archdeacon Gregory's edition of the New Testament in Greek; and he left behind him many MSS. some of which have been published. Biog. Brit.

GRABEN, in Geography, a town of Croatia; 12 miles S. of Varazdin.

GRABO, a town of Sweden, in East Gothland; 11 miles S.E. Linköping.

GRABON, a town of the duchy of Mecklenburg, on the Elbe; 80 miles N.W. of Berlin. N. lat. 53° 23'. E. long. 11° 44'.

GRABUSA, an island of the Mediterranean, near the N.W. coast of the island of Candy, confirmed to the Turks by the peace of Carlowitz, and generally garrisoned with 1000 men. N. lat. 58° 40'. E. long. 23° 33'.

GRABUT, in Geography, an obscure French musical composer, whose name is not to be found in the annals of the art. He was brought into England to flatter the partiality of Charles II. for the music of France; and employed by Dryden to set his political opera of "Albin and Albanus," though Purcell had already given indisputable proofs of his superior genius, and was rapidly rising into fame and national favour.

This drama, written under the auspices of king Charles II., was reprinted several times, as the author informs us in his preface, before his majesty, "so had publicly declared, more than once, that the compositions and choruses were more full and more beautiful than any he had heard in England." We believe this prince was not very skilful in music, nor very sensible to the charms of any species of it but that of France, of the gayest kind; however, royal approbation is flattering and extensive in its influence. Unfortunately for the poet and musician, his majesty died before it was brought on the stage; and when it did appear, the successes feem not to have been very considerable. Upon a perusal of this drama, it seems hardly possible, so near a revolution, that it should have escaped condemnation upon party principles; as, under obvious allegations, Dryden has lathed the city of London, democracy, fanaticism, and whatever he thought obnoxious to the spirit of the government at that period. Had Orphius himself not only composed the poem and the music, but performed the principal part, his powers would have been too feeble to charm such unwilling hearers.

GRAÇAY, in Geography, a town of France, in the department of the Clercy, and chief place of a canton, in the district of Bourges; 9 miles S.W. of Vierzon. The place contains 2264, and the canton 5459 inhabitants, on a territory of 145 kilometres, in 9 communes.

GRACCHURIS, an ancient town of Hispании Tarraconensis, mentioned by Livy, Antonine, and Ptolemy, and said to be built by the proconsul Titus Gracchus Sempronius, after having conquered the Celtiberians. Others suppose that it existed before Sempronius, under the name of "Hericius," and that he only repaired it. It is now called Arr Soldier.

GRACCHUS, Tiberius Sempronius, in Geography, a person very memorable in the history of Rome, was the son of a father of the same name, a distinguished commander, and excellent citizen, who, from the Plebeian ranks, arrived at distinguished honours, and the highest offices in the state, having been master of the horse to the dictator, Junius, after the celebrated battle of Cannae, afterwards consul, and, at length, to complete his glory, he was slain while fighting for his country. The mother of the subject of this article was Cornelia, daughter of Scipio Africanus, whose character has been illustrated in the proper place. Tiberius received every advantage of education that the pious affection of a wise parent could bestow, and his natural disposition seconded the efforts of his instructors. He was modest, and remarkably mild in his temper; and became, at a very early age, distinguished for eloquence, sobriety, and political knowledge; and his reputation was fed by an admixture into the venerable college of augurs. It is mentioned, as a proof of the high character which he fulfilled, that Claudius Appius, one of the most illustrious perfons in Rome, and president of the senate, offered him, spontaneously, his daughter in marriage, which he thankfully accepted. When Appius informed his wife what he had done, she replied, "Why so suddenly, you might have taken
taken time, even if Tiberius Gracchus were the man.” In
conformity with the Roman custom, Tiberius paid his
youth in military service; first in Africa, under his brother-
in-law, the younger Scipio, where he obtained great credit
in the army, being equally beloved by those above and those
below him. He was made quæstor, in the Numantian war,
to the consul C. Hollius Mancinus. This was in the year
B. C. 137: the campaign was unfortunate, and the Roman
general was under the necessity of negotiating a treaty of
peace with the enemy.

The Numantines, who had been betrayed in a former treaty by the Romans, refused to nego-
ciate, unless it were with Tiberius Gracchus, with whose
character for probity and strict honour they were well ac-
quainted. This being admitted, a peace was immediately
concluded. The treaty, though as favourable as possible,
circumstances, could be expected, was received by the
Romans with great indignation; they determined to annul
it, and to deliver those, who had been instrumental in making
it, into the hands of the Numantines. The confuion
was accordingly given up to them, naked and in chains, and it
is probable that Tiberius Gracchus would have shared the
same fate had not a powerful intercess been excited in his
favour. A sense of the injustice of the Senate on this occa-
sion, and resentnent of the dithour they had thrown upon
his treaty, was supposed to be a principal cause of the sub-
sequent hostilities in which he engaged against that body.

The condition of the Romans, at this period, afforded a
good opportunity for the exertions of patriotism; for the
great mass of the lower classes of citizens were in a state of
absolute poverty. Lucius the Wife, the friend of Scipio,
had attempted to introduce some remedy for this evil, but
the serious opposition of men in power had deterred him
from the execution of his plan. Tiberius Gracchus resolved to
take up the cause. He was accordingly elected a tribune of
the people, and proposed a revival of the Lexian law, with
certain modifications, which greatly fastened its operations.

(See Agrarian Law.) It offered a full compensation
out of the treasurers for all the land above the 500 acres
allowed, which any one might be obliged to resign to the
public, and permitted every child of a family to hold 250
acres above the 500 held in the father’s name. This proposal
was received, as it might be expected, by the superior orders,
whose rights and properties were to be affected by it; they
were determined to stand by another one in refuting the
innovation. On the other hand, Gracchus felt no time in
rushing the people to a knowledge and affront of their
claims as men and members of society. His speeches
were addrefed to their interests and their feelings; his
arguments were specious and highly dangerous to the peace
of those whose wealth was become the object of popular
diffusion. In one of his harangues, he exclaimed, “The
wild beasts have their caves and dens, but the brave men
who shed their blood in the cause of their country have
nothing free but the air and the light. It is a mere mockery

when their generals exhort them to fight for their fucphulces
and household gods, when, perhaps, not a man among them
is poiffessed of a domestic altar, or fuscphule, of his ancestors.
The private men bleed and die to secure the luxuries of the
great, and they are denominated the masters of the world,
while they are not owners of a foot of ground.” At length,
after much tumult in the fenate, the Agrarian law was paifed,
and Appius Claudius, Tiberius Gracchus, and his younger
brother Caufus, were appointed commissioners to carry its
provisions into execution. In his progress in the bufi-
ness he was embaffied with many obflacles; and, on his
part, he took measufes effectually to thwart the purposes of
the great; and, by new laws which he got enacted, he ren-
dered the property of all the old families infecure. The
difficulties which occurred in carrying the new law into
effect were fupplied by the death of Attalus, king of
Pergamus, who was one of the friends of Gracchus. A
law was enacted for the distribution of his treasures
among the poorer citizens, and for the dispofal of the rev-
ue of Pergamus, not by the Senate, but by the assembly
of the people. These meafures gave him a great degree
of influence among the citizens, and he conceived the design
of securing the powers of which he felt confiderv possessed,
by raifing his father-in-law to the confulate, his brother to the
tribunifhip, and continuing to himself the fame office
another year. He also planned other regulations for abridg-
ing the authority of the patriots, and throwing more weight
into the popular fcale. The day of election was approaching,
and the fentiors resolved to make a fand againft the
innovations which he proposed, and a conspiracy was openly
formed to take away the life of Tiberius Gracchus. Of this
he was informed by a friendly fentior, as he was proceeding
to the capitol. He, nevertheless, advanced, and his party
prepared to repel force by force. In the uproar, he at-
tempted to pfeak, but his voice could not be heard. He
made figns to his friends, by making signs to the people, to
fave him. This signal was instantly interpreted by his enemies as a demand of the regal crown,
and Scipio Nafica, the invenior of enemy of Gracchus, cried
out “Since we are betrayed by our confual, let thieves
who love the republic follow me.” A general content now
commenced. The adherents of Gracchus were quickly dis-
perfanded, and himself was dispatched with a thousand blows.

Not few than 350 persons were slain in this commotion, and
the bodies of the dead, even that of Gracchus himfelf, were
ignominiously thrown into the Tiber. Several of his friends
were afterwards banifhed, and not a few put to death, with-
out the form even of trial, and the Senate passed an act of
indemnity for all thieves who were concerned in the mafiace.
The people, however, indignant againft his enemies, drove
Nafica from Italy, and would never permit him to return.

With respect to Tiberius Gracchus, his character has been
celebrated either as that of a martyr to liberty, or as a
victim to lawless ambition, according to the different prin-
ciples of those who have commented on his actions. Many
have thrown on his memory reflections as unanswerable as
they are unfounded. It seems to be acknowledged on all hands that
he possessed great talents, and was eminently qualified for his
private worth. That he was a man of ambition none will deny,
and it may be that a love of popularity suggested the great
meafures which he proposed; nevertheless, the historian
may be safely followed, who fays, that he was actuated by
the best intentions, but that he proceeded with too
much violence.

Gracchus Caufus, brother to Tiberius, but his junior
by nine years, enjoyed the fame advantages of education
with his brother, which he so well improved as to be-
come one of the ablest orators of his time. Cicero fays of
him, that he knows not if he had his equal in eloquence,
and recommends his compositions, though unfiftendid, to the
study of youth. After the tragical end of his brother,
Caufus pafled some time in retreat, cultivating his rhetori-
cal talents, and secretly preparing to act his part on the theatre
of the public. In the year 125 B. C. he accompanied the
confual A. Aurelius Orellus to Sardina as his courier, and ob-
tained great applause, as well for his humanity and temper-
ance, as for a strict attention to the duties of his office.
The Senate shewed evident signs of jealousy on account of
the
the popularity of which he acquired, and retained him as pro-
quellor in Sardinia in order to keep him at a distance from the Roman forum. Perceiving their intentions, he ventured, in defiance of their orders, to quit the island without leave of his commander, and suddenly made his appearance at Rome. He was called to account for this breach of military discipline, but was readily acquitted. Soon after he became a candidate for the tribune-shaip, and such was the zeal of the people in his favour, that the Campus Martius was not able to contain the multitude who flocked from the Italian towns to support his election, and many gave their votes from the tops of the adjacent houses. Cais had not forgotten the enemies of Tiberius, and would have purged them to their destruction, but was probably dissuaded from it by his mother. His speeches were calculated to revive the indignation of the people against the senators for their conduct towards Tiberius, and he proposed and carried motions for confirming his brother's laws, and the passing of others still more obnoxious to the patricians. He was appointed commissioneer for the division of lands among the poor citizens and allies, and in his progress through Italy he employed his talents and wealth in repairing roads, building bridges, and in other works equally useful and important. He established public granaries in Rome, from which the citizens were to have their monthly distributions of corn at a low price, the expenses of which were to be defrayed by duties laid on goods imported into the dominions of the late king Attalus. By these, and other acts of a like kind, he ingratiated himself with the people, that he was chosen a second time tribune. Triumphing in his success, he proposed a law for transferring from the senators to the knights the cognizance of all private causes. When he had obtained his purpose he exclaimed, "at length I have humbled the senate." He now felt himself the arbiter of the republic, and treated the patricians with contempt. This behaviour hardened his ruin. There is a point, beyond which the most successful man, whatever be his pretensions, cannot go with safety. Cais had transgressed this boundary, and his enemies were perpetually on the watch for opportunities to check his power, and to introduce rivals who might, by the appearance of more liberality, depress his reputation and influence in the state. During his absence in Africa his enemies were ever on the alert to injure his fair fame, and to ascribe unworthy and base motives to all that he did or proposed to do; and in the tumult which accompanied the discussion of some of his laws after his return, he fled to the temple of Diana, and, unwilling to fafferve either himself or his adherents to popular fury, he proposed terms of accommodation. These were rejected by the arts of Opimius the conful, and a price was instantly put upon the heads of Gracchus and his friend Fulvius. A formal battle ensued, in which multitudes were slain on both siles, and the populac without hesitation deserted their friends: Fulvius concealed himself, but, being discovered, was instantly killed. Gracchus, having solemnly impetrated upon the heads of the Roman people perpetual flavery for the base defecion of the caufe, left the city and passed across the bridge named Sublicius. His retreat was favoured by two faithful friends, who defended the bridge till they fell covered with wounds. In the mean time Gracchus reached a grove faced to the furics, where it is said a flave, by his order, flri dischanched him, and then put an end to his own life. Others have, however, given a different account of the matter; they say that he was over-taken by his enemies, and had them killed. His head was cut off and nailed to the caufe for its weight in gold. The body was thrown into the Tyber, but afterwards being taken from the water it was delivered to his affiduci mother for burial. This catastrophe, in which three thousand persons perished, happened in the year 121 B.C., and the senate immediately proceeded to aboish all the laws of the Gracchi. Their names, however, were still fondly cherished by the people, statues were erected to their memory, and the places in which they were killed were consecrated, by religious rites, to their names. Cais has been generally considered as less pure in his intentions, and less moderate in his plans, than Tiberius. From the evidence of history it should be seen, that the disturbance of the public tranquility was rather owing to his opposers than to him; "so that," says the historian, "instead of calling the tumult of that period the "sedition of the Gracchi," we should rather call them the sedition of the senate against the Gracchi, since the efforts of the latter were made in vindication of a law, to which the former had assented, and as the designs of the former were supported by an armed power from the country that had never before interfered in the business of legislation, and the introduction of which gave a moat irrecoverable blow to the constitution. Cais in his person was graceful, his action was strong and impressive, his voice of great compass and melodious when the vehemence of his pleading did not raise it to too high a key; to correct this defect he was accustomed to place a judicious person behind him with a pitch-pipe, by which he was enabled to regulate his tone. In temper he was warmer than Tiberius, nor was he distinguished by frugality of manners, though in this respect he might be advantageously compared to the Roman youth in general. Plutarch. Unier. Hist.

GRAC, GRATIA, 299, in Theology, denotes in general any gift or favour, which God freely bestows upon mankind; whether such gift pertains to the present or future life; but as those which relate to the improvement of their temper, and their fitness for final happiness, were favours of the greatest importance, this term is by way of eminence applied to them. The proper figurition of the word grace is favour;—favour in such a sense as denotes mercy and goodnes in a superior, either remitting somewhat of his own right, or conferring somewhat benefical upon others, freely and without any obligation of debt. And because this may be done in various modes and in a great diversity of instances, hence the word grace in scripture is accordingly applied in a corresponding diversity of figurations. Sometimes it signifies those extraordinary gifts and favours of the Holy Ghost, by which the apostles were enabled to demonstrate the truth of their commission, to teach the church with authority, to convince gained persons with evidence, and to govern the churches by a proper distribution of different truths and offices. The gifts or powers, by which the apostles were enabled to do all these things with extraordinary efficacy and succe, are therefore called grace, because they are not at all natural acquisitions but free gifts of God; distributed to every one, not according to the will of man, but at such times, and in such proportions, and to such persons, and for such purposes as God himself pleaseth. See Rom. i. 5. Ephes. iv. 7. 11.

In other passages, the fame word is used to signify that extraordinary aflaince and support which God has been pleased sometimes to afford to his servants under extraordinary difficulties and trials; and this is called grace, because it is considered as given particularly and gratuitously upon extraordinary occasions over and above the general supports arising from the confiderations of reason, and from the promises and motives of the gospel in general. See 2 Cor. xii. 9.

A third sense, in which the word grace sometimes occurs in the New Testament, is to express such moral virtues as are the effects of men being influenced by the spiritual
motives of the gospel, and the practice of which prefers men in the favour of God, and recommends them to his gracious acceptance. (See Eph. iv. 29. 2 Pet. iii. 18. 2 Cor. viii. 1, 6.) Moral virtues are plainly for this reason distinguished by the denomination of grace, because they proceed from and are founded on a regard to God in general, and in particular to his will revealed under the gracious dispensation of the gospel of Christ.

Another signification of the word grace in Scripture is to express the merciful acceptance of repentance and amendment, by which God is pleased, not out of any obligation of justice, but in gracious goodness, to restore men to favour. In this sense Paul says (1 Cor. xv. 9.) "By the grace of God I am what I am;" to John, i. 17., the doctrine of Christ is styled "grace and truth." The Apostles' preaching is by St. Luke (Acts, xiv. 3.) called "the word," or declaration "of God's grace: " to which St. Paul declares (Rom. iii. 24.) that repeating sinners are "justified freely by grace," and blaming those "who continue in sin, that grace may abound." The word grace in all these passages signifies that merciful and compassionate disposition of the divine nature, by which God freely remits of his right of punishment, and receives penitent sinners, upon more gracious terms, and to greater degree of his favour, than he was bound to do by any obligations of justice.

Hence it is, that the gospel itself, as being the great and standing declaration of God's mercy and goodness towards men, shown forth in the free pardon and forgiveness of sin upon the gracious terms of repentance and amendment, is in the New Testament very frequently meant by the phrase, "the grace of God." (Clarke's Serm. vol. ii. p. 265-257. 8vo. fol. ed. vol. i. p. 180, &c.) Bishop Pearce (Comm. on p. 259.) renders υπὸ τῆς ὁμοθυματίας, in 1 Cor. x. 3. Thanksgiving, and not grace, as it is in our version; and he observes that the sense of the word υπὸ τῆς ὁμοθυματίας is too frequent in St. Paul's writings to require a proof of it. He adds that υπὸ τῆς ὁμοθυματίας in the latter part of the verse confirms this sense.

Some divines define grace to be any degree of divine influence on the mind, inclining it to believe in Christ, and to practice virtue; and those divine influences, which are not effectual in producing saving faith and sincere obedience, they call common grace, in contradistinction to special grace, the operation of which is completely efficient and saving; and those influences which introduce special grace, though they do not actually amount to it, are with respect to that introduction sometimes called preparatory. It is disputed among theologians whether special grace, which they suppose is never on the whole finally rejected, so as to fail of working faith in those who are the happy objects of it, be in the nature of its operations upon the human mind irremissible or not; and it is also questioned, whether common grace be sufficient. Whether the mind be entirely poftive in the first moment of its conversion, or whether there be any cooperation of our own; together with the influences of Divine grace upon the heart, is a question, which has been also very much disputed amongst divines of a particular description; and another question, to the subject of controversy, is similar to the former, and that is, whether the work of regeneration and conversion be accomplished in an infant. But we should far exceed our preferred limits if we were to state the arguments pro and con on questions of this nature.

Grace, in Law, is sometimes used for a faculty, licence, or dispensation; but this seems to be only in a case where the matter proceeded, as it were, ex gratia, of grace and favour; and not where the licence or dispensation is granted of course or of necessity.

Grace is also a term in the formula of all patents, &c., which begin, George, by the grace of God, king of Great Britain, &c. The Roman bishops frequently began their mandates in the like manner: such a one, by the grace of God, and the holy see, bishop of, &c.

The English archbishops say, by divine grace, or divine providence. See Archbishop.

All sovereigns use the phrase grace of God; as emperors, kings, princes, &c. Anciently dukes, counts, and even lords, talked in the same style. In the new collection of Father Martene we meet with a mere seigneur, or lord, qualified by the grace of God seigneur de Comborn. Louis XI. forbade the duke of Brittany to style himself by the grace of God.

Grace is also a title of dignity, attributed to princes of inferior rank, and who are not qualified for that of highness.

In former times the kings of England were addressed under the title of grace, as they are now under that of majesty. See King.

Our English dukes and archbishops are still addressed under the title of grace. But that title is most frequent in Upper Germany, and particularly Austria, where it is borne by the barons, as being inferior to that of excellence.

Grace is also applied to persons, and various kinds of performances, to denote a quality, or rather the result of a combination of qualities, which attracts peculiar notice, and affords peculiar pleasure.

Grace is also used for a short prayer offered before and after meat. This practice is very ancient, and has very generally obtained both in the heathen and Christian world; and hence grace-cup is used by some of our poets for the cup or health drank after grace.

Grace, in the arts of Painting and Sculpture, is used to signify a peculiar quality which heightens the effect that beauty of form is calculated to produce, and renders it still more engaging.

We have already, in the article Beauty, slightly touched upon this subject, and there mentioned the origin of the term among the Greeks; who gave to the Charities or Graces, whom they deified, the presidency over whatever was amiable and engaging in the actions or sentiments of mankind. By the undistinguished nudes of which they always represented these deities, to whom they gave the names of Aglaia, Thalia, and Emphymone; they allegorized the pure fincerity and simplicity in which acts of kindness should always be wrought. By the union of these perfections, which are generally holding each other by the hands, or with their arms round each other's necks, they marked the union of spirit which dictates acts of benevolence and social intercourse; and by devoting them to the service of Venus, exemplified the necessity of uniting the virtues of humanity to the beauties of person, in order to become truly engaging.

This allegory of the ancient Greeks leads us to the just conception of the meaning of the word grace when applied to the arts. Whatever can lend to beauty, increase of interest upon the beholder, is entitled to be called graceful, or at least elegant. (See Elegance, in Painting.) As the heart of man, when inclined to good, is to his mental, so is grace to his personal accomplishments; that, which gives the most delightful gratification to those with whom he associates. Without it, art is nothing, compared with the values it acquires by its presence. Independent of all which confitutes mere beauty of form, it is absolutely necessary to give it its full force, its greater effect, viz. that which beauty
beauty acquires by motion, wherein alone grace is visible.

Poets as well as painters and sculptors acknowledge the value of this quality; and the bell have constantly applied it to the objects of their adulation when moving. Milton says of Eve, "Grace was in all her legs." Ariosto adds it to all the beauties of his Alcina; when he says,

"Avea in ogni parte un lascio teso
O pari, o ride, o cantar, o passa nova."

The graces, lurking about the mouth and the eyes of a beautiful person when in motion, are the most constant theme of poets, and as constantly the source of emulation to the painter and sculptor to imitate; and when the artist has by his ingenuity discovered and represented truly those minute variations of form which take place both in figure and features, when the mind is excited by some amiable emotion; he has obtained the ultimatum of his art; no power can go beyond it. Apelles, the ancient Greek artist of most repute, declared of his contemporaries, that their several works professed every beauty but the perfection which grace alone can give; in this he found himself unrivalled. Ancient sculpture is fraught with it; their figures, whether in action or repose, profess it; and when we lay that it may be found in figures reposing, we do not militate against the sentiment that action is the basis of grace; a previous motion being supposed to have taken place, to produce the graceful polishing. No figure, standing, sitting, or lying down, can be graceful, however beautiful it may be, whose parts or members are presented altogether straight and full to the eye. Without some varying turn being given to the head, the body, the arms, or the legs, it will be in vain to look for grace; and it is their being arrested in the action they may assume, at the most agreeable and expressive point of view, which gives the consummation of this invaluable quality to them. Then, if fixed for ever, they will be for ever graceful; and the delight which the contemplation of their mere beauty of form and proportion conveyed, will be heightened to the summit of that gratification which art is enabled to afford.

Wherein then lies this source of perfection? How, with certainty, may we express it in our works? is the hitherto unanswered query of the artist; or answered but in part and unsatisfactorily. All writers on painting have touched upon grace, and gone have attempted to give information of the principles whereon it rests. Lomazzo, in his Trattato della Pittura, says, that Michael Angelo gave the following precept to Marcus de Sirena, his pupil. "That he should always make a figure pyramidal, serpent-like, and multiplied by one, two, three!" In which precept (Lomazzo continues) in mine opinion the whole mystery of the art confilits. For the greatest grace and life a picture can have, is, that it expres motion. Now there is no form so fit to express motion as that of flame of fire." This text is again repeated by Du Freynoy, and thus has Dryden translated the passage: "Large flowing gliding lines, which are in waves, give not only a grace to the part, but to the whole body, as we see in the Antinous, and in many other of the antique figures. A fine figure, and its parts, ought always to have a serpent-like and flaming form; naturally, these forms of lines have I know not what of life and seeming motion in them; which very much resembles the activity of the flame and of the serpent."

On these two remarks our own industrious and skilful Hogarth has built a system, which, if it be not altogether complete, has yet much capacity and utility in it, and which he has given to the world in his Analysis of Beauty. He therein adopts the serpentine line, (which he illustrates by supposing a wire drawn spirally round a cone from its base to its apex), as the basis of grace, with much apparent truth; and he is most certainly supported by all those fine works wherein gracefulness is acknowledged to reside. The Torso of the Belvidere, the Venus de Medicis, the Apollo Belvidere, the Laocoon, who, in the midst of the violent anguish he suffereth, still possessest grace. All that is and indeed all others, which have any pretensions of the like kind, have the serpentine line for the base of their composition, in a greater or less degree. Who shall laugh at a system upheld by such authority? Walpole attempts to ridicule it, as well as others, because Hogarth was not equal to put it in practice. The futility of such an argument needs no illustration. To conceive a thing in the imagination, and not be able to exemplify it by practice, is by no means an uncommon occurrence among artists, or among men; yet the propriety of the conception may be unquestionable, taken on general grounds. Hogarth's mistake appears to have been, having fixed the boundary of grace; in giving where he said it lays the present line of it; whereas, all the antique figures mentioned above are graceful, while each varies from the other in the quantum of curve which its action contains of. Hence arises, that he too narrowed the sphere wherein grace was observable, which in nature is found to be so widely extended, that, without just confusion, his ingenuity was regarded as the ravings of excess; whilst no good arguments were adduced to disprove the general principle, which appears to us to be just. How to employ it, is another question. And here we fear no rules will suffice to guide the practitioner in art. As we said of elegance, we repeat of grace: he that is endowed by nature with a power to feel its beauties, and display its effects, may, by cultivation, improve his original stock; but he that requires to be taught what grace is, will, in vain, seek to obtain the power of painting it; if he ever arrives at the knowledge of it, or the power of feeling it, in nature or in art. A constant observation upon the actions, in figure and feature, of those who are by nature graceful, is the best school in which to study it, and the readiest mode to discern wherein it lies.

Grace is not, or rather ought not, to be confined to the figures in a composition. Every part of the picture should have a conjunctive effect to produce grace in the whole. Contrast of form will aid the beauty of the principal parts, but that contrast should never force itself into notice, the artifice would then become apparent, and the eye would not be led to the beautiful parts, but, on the contrary, be detainted from them. The painter therefore who has conceived a graceful figure, should either paint it singly, or be careful to support it, by proper accompanying lines and objects, that its beauty be not lost in the mass, and its effect overpowered by other forms of less value becoming obtrusive to the observer. And great care should be taken to prevent every attempt to produce grace in the action of figures, from degenerating into affectation. Where that begins, grace ends; and detestation or ridicule, instead of admiration, becomes the meed of the artifize! No vice in art is so odious as affectation! If the bell executed work imaginable were unhappily tainted with it, few minds of an elegant or graceful turn of feeling will bear to dwell upon it. Those artists who allow their minds to be imposed with the passion or emulation they wish to convey in their figures, and hence conceive the action of them, are not so liable to fall into this error, as those whose ideas are more intent on making an agreeable picture, and think of the actions, before they have considered the passions of their figures. Raphael is an instance of the former; Correggio and Parmigianino, of the latter.
GRACIAN, Balthasar, in Biography, an eminent Spanish writer, was born in 1603. He entered among the Jesuits at the age of sixteen, and became a teacher in their society;
GRA

Leiety, of the belles-lettres, of philosophy, and of theology. He likewise exercised the duties of a preacher, and was at length rector of the Jesuits' college of Tarragona, where he died in the year 1658. He was a much esteemed author, and most of his works have been translated into French and other foreign languages. The principal of these are "The Hero;" "Reflections on the political Conduct of Ferdinand the Catholic;" "A Treatise on the different Kinds of witty Conceptions." A work treating of the errors to which man is liable, and a collection of meditations on taking the holy communion. Morevi.

GRACIAS a Dios, in Geography, a town of Mexico, in the province of Honduras, and abode of Guatimala, situated at the mouth of a river, which communicates with the bay of Honduras. It has some gold mines in its neighbourhood. N. lat. 14° 30'. W. long. 90° 6'.—Alfo, a cape on the N. coast discovered by Columbus. N. lat. 15'. E. long. 132° 50'.—Alfo, a cape, called "Falce Cape Gracias a Dios," on the coast of Nicaragua, 63 miles from the other. N. lat. 13° 36'.

GRACILIS, in Anatomy, a muscle of the leg, thus called from its slender shape.

It arises partly tendinous, and partly fleshy, from the os pubis internally, between the first and second heads of the triceps; and in its descent on the side of the thigh, grows narrow, and becomes tendinous, a little below the bartorius, and is thus inserted into the tibia. It affords in bringing the thigh and leg forwards.

GRACILIS Retinu, a name given by Riolan to one of the muscles of the leg, called by Winflov the rectus cruris anterior, and by Couper the rectus femoris. Albius calls it the rectus cruris.

GRACULA, in Ornithology, a genus of the order Pige, having the bill convex and acute at the edges, the base rather naked; tongue entire, sharipifi, and feistiy; and the feet formed for walking. The genus gracula corresponds with the mainate of Brifon, from whom it appears to have been adopted by Linneus under the former term. Some of the species of this natural tribe were known to Ray, who refers them to the crows; and also to Wullughby, who considers them as of the flare or flaring kind. The species of gracula, described in the Gmelinian Systema Naturae, amount to twelve; and this number is increased to fourteen in the work entitled "Index Ornithologiseus" of Dr. Latham, by the addition of the new species lteropes, and the introduction of the Limmian Paradisifne trills, which latter the author of the writer has deemed it requisite to remove to this place. As a secondarily to the essential or generic character above described, it may be proper to observe that the birds of this kind have the bill thick, and compressed at the sides; the nostrils small, at the base of the bill and sometimes situated near the edge; the toes three forward and one behind, the middle toe connected at the base to the outer one, and the claws hooked and sharp. Their principal food consists of fruits and insects.

Species.


The length of this bird is ten inches and a half, its bulk equal to that of the black-bird: the bill an inch and a half long, of an orange colour tipped with yellow; the legs tawny or orange; feathers of the head, except the middle ones, very short and silky; and the naked band reaching nearly to the neck. This species is found in many parts of India, and not unfrequently in a tame or domesticated state, being naturally of a familiar disposition, and capable of being taught to whistle, sing, and imitate the articulations of the human voice with greater precision than any of the parrot tribe. In the islands of Sumatra and Java it is called by the natives bill-menaya, and in China, whether it is imported from the latter place, its common name is Teoong. Several supposed varieties of this bird are described by writers, the most remarkable of which is that called the greater minor grakle, le grand mainate of Brifon; this entirely corresponds with the ordinary kind, except in size, which it materially exceeds, being in this respect not inferior to the jackdaw; it inhabits the isle of Hainan, in Asia.


Size of the black-bird, with the head and cheeks bare of feathers and flesh-coloured, except a narrow lift of short brown feathers, extending from the base of the bill to the back of the head; the naked part becoming of a deep red when the bird is irritated: the general colour above is silvery-ash, beneath grey-brown, bill and legs brown. These birds build their nest in the hollows of trees, especially preferring those of the cocoa-nut: it is represented as a noisy flittering bird, of voracious appetite, and as living principally on fruit. Found in the Philippine islands.

FESTIVA. Black; exterior part of the quill-feathers blueish; band round the neck naked. Linn.

Native of America, in size resembling the magpie: the head with erect, short, silky feathers; nostrils oval and naked; tongue sharp; and tail even at the tip.

BARL. Somewhat grey; shoulders blue; quill-feathers at the outer edge green. Linn. Menula tota nigra, Ray. Boat-tailed grakles, Lath.

Size of the cuckow: the bill shortish, rather black, paler beneath and naked at the base; the plumage black, inclining to grey, and glossed with purple; tail rounded, concave when folded, and becoming flat on being expanded; legs and claws black. The species inhabits the AntiUy islands and North America. It feeds on insects and fruits.

CRITATELLA. Black, the first quill-feathers at the base, and tail-feathers at the tip white; bill yellow. Gmel. Merula jenevis cristata, Briff. Merle beouf de la Chine, Buff. Chinese flaring or black-bird, Edwards.

A species rather larger than the black-bird; the plumage inclining to blue, with a crest of feathers on the head which it can raise and depress at pleasure; greater quill-feathers from the base to the middle white, the remaining part deep blue; tail-feathers, except the two in the middle, tipped with white; legs dull yellow. The crested grakle fings and talks like the species religiosa, but with inferior distinctness; and is frequently kept in cages in China, which country it inhabits in a wild state; its principal food is rice, worms, and insects.


Native of Bengal. Size of the Miffel thrush, with the head, neck, breast, back, rump and upper tail-coverts black; belly, sides, thighs, and under tail-coverts white; tail even at the end, black above, and white beneath. The female differs in being black instead of brown on the fore-
part of the neck and breast, and in the white being mere obscure.


Native of the West Indies, and the warmer parts of America, and the West Indies; sings finely, builds on trees, is destructive to plantations, but useful in destroying the noxious insects that infest them. The skill is black and unavory. Its fize is about that of the black-bird, the male a little exceeding the female in bulk; the bill and legs are black; tail long and cuneated, and with the wings purple; the female entirely dusky.

**Bullock.** Greenish-blue; belly rufisy; legs blood-red. Linn. *Corrus Egyptius,* Haffele. *Egyptian grackle,* Lath. Size of a duck, and is putpowed by Hailfiequit to feed on insects, the remains of centipedes and scorpions being found in the stomach. The bill is black; neck with a longitudinal rufiy line each side, and the claws black.

**Longirostra.** Brown, beneath ochre-yellow; head and neck black; band round the neck naked and wrinkled; area of the wings white; tail cuneated, black, and at the tip white. Pallas, &c. Native of South America; length eight inches. This appears to be the same species as that described by Sornini under the name of melus des Savannes.

**Sturnina.** Hoary; spot on the crown and back between the wings violet-black; tail and wings with a tinge of green, the latter with a double white stripe. Pallas.

Inhabits the Ozie banks of Daumur; the nest and eggs resemble those of the thrush; the plumage of the female is dirty ash, with the back brown; and the wings and tail deep black.

**Icterops.** Black; band on the wings and body beneath white; the region of the eyes naked and wrinkled. Lath. *Le mainatp a face jaune,* Vieill. *Yellow faced gackle.*

Length seven inches and a half; bill compressed; nostrils oval; legs yellow and wrinkled. Native of New Holland.

**Cayanas.** Striated; above tawny, beneath yellowish; head of chin varied with tawny and white; tail wedged, fith and with the wings tawny. Gmel. *Chinking gackle.*

Inhabits the interior parts of Guiana; is about ten inches in length, and remarkable for climbing trees; the bill is black; about two inches long, and a little curved; the legs are also black.

**Caruncula.** Cinereous; tail and quill-feathers black; crown and chin with warty excrescences. Gmel.

Length six inches; and supposed to inhabit the Cape of Good Hope.

**Melanophon.** Head black, front white; back, tail, and wing-cover white; the bill with a transverse white line near the extremity. Don. *Graculus melanophthalus,* Lath. *Le mainatp a tete noire,* Vieill. *Black-headed gackle.*

A species recently discovered in New South Wales; its height is about eight inches; the bill yellow, a little bent, and formed at the base like that of the Turtls, or thrush tribe; the tail three inches long; the legs very long in proportion of a pale yellow ochre-colour, and armed with strong blackish claws.

**Virdis.** Dull green; throat above brown and blackish varied; under parts of the plumage white, with some blackish streaks; wings blackish, edged with white; tail blackish, with white tip. Don. *Graculus viridis,* Lath. *Le mainatp vert,* Vieill. *Green gackle.*

Lately found; the species inhabits New Holland, and appears to be very rare; the bill is strong, somewhat inclining at the base, and the colour of horn; the legs blackish.

**Cyanotes.** Space about the eyes bare of feathers and bright blue; head black, with a white cres in the hind part; upper part of the body, neck, upper, wings, and tail yellowish-green; breast lead-colour; plumage beneath white. Don. *Graculus cyanotis,* Lath. *Le mainatp a oreillet bleue,* Vieill. *Blue eared grackle.*

Length twelve times a half; bill black; legs blue black, with very hooked black claws. Native of New South Wales.

**Picata.** Greater part of the head, neck; transverse band on the breast, back, border of the wings, and tail above nearly to the tip black; throat, breast, wing-cover, body beneath, and under surface of the tail-feathers white. Don. *Graculus pecta,* Lath. *Le mainatp pecta,* Vieill. *Pie grackle.*

Rather larger than the black-headed gackle, and like that species inhabits the regions of Australasia; the general colour black and white, the former partially glided with purple; bill yellow, and corresponding in form with that of the black-headed gackle; and the legs lead colour.

**Graculus,** the Shagge, a species of *Pelecanus;* which fee. — Also, a species of *Corvus;* which fee.

**Gradation.** The act of ascending, step by step, to any pitch or eminence; from the Latin *gradus,* degree, step.

**Gradation,** in Architecture, signifies an artful disposition of parts, rising, as it were, by steps or degrees, after the manner of an amphitheatre; so that those placed before do no difference, but rather service, to those behind.

The painters also use the word gradation for an insensible change of colour, by the diminution of the tints and shades. See below.

**Gradation,** in Chemistry, is a kind of procés belonging to metals. It consists in gradually raising, or exciting them to a higher degree of purity and goodness, so as to increase their weight, colour, confidence, &c.

**Gradation,** in Logic, is an argumentation, consisting of four or more propositions, so disposed as that the attribute of the first is the subject of the second; and the attribute of the second is the subject of the third; and so on, till the last attribute come to be predicated of the subject of the first proposition. As in Porphyry’s tree; man is an animal; an animal is a living thing; a living thing is a body; a body is a substance; therefore man is a substance.

An argument of this kind is liable to many fallacies; both from the ambiguity of words and things; &c. Peter is a man; man is an animal; animal is a genus; genus is an universal; therefore Peter is an universal.

**Gradation,** in Painting, relates both to chiaroscuro and to colour; that is, all the different degrees in which light and dark, and colour may be modified, are comprehended in it.

An object receding from the light, and gradually losing it, becomes at its farthest extremity obscurely defined. A coloured body, pure or bright in tint, under the same circumstances, gradually diminishes in clearness of hue through out its receding parts, and becomes dull and dark. By fixing the scale of gradation in both these particulars, effects of great force or great simplicity may be produced. The scale of defcent being made rapid, great force will enue, from the strong oppositions it promotes; and the reverse will take place when the degrees of descent are prolonged, and lets contral thereby effected. The nature of the subj
The gradation of colour includes not only what is mentioned above, viz., the different degrees of purity, or brilliancy of the same colour, but also the approximations of each colour to its neighbour, necessary to produce harmony; and also the art of gradually losing the local colour in obscurity, and yet maintaining the character of it in the object; which is extremely difficult and of great importance in the art of painting.

Gradation, in Rhetoric, is when a series of considerations or proofs is brought rising by degrees, and improving each on the other. See Climax.

Such is that in Cicero to Herennius: "Africanus induit duæ virtutes, virtutis gloriae, virtutis omnium comparativit."

Gradus, Italian degrees. Every ecclesiastical mode, and every key in regular music, has its gradus, its scale; no note of which can be changed by an accidental flat, sharp, or natural, without changing the key. As in the key of F major with one flat at the clef, annul that flat by a natural, and the key is changed to C, and another flat and it modulates into B B.

Gradisca, or Gradisca, in Geography, a town of Germany, and capital of a small county, annexed with Goritz to the dominions of Austria, seated on the Lison, built in the year 1473 to stop the incursions of the Turks, additionally fortified in 1764, and erected into a bishopric in 1784; taken by the French in 1797: 5 miles S. of Goritz. N. lat. 46° 2'. E. long. 13° 27'.—Alla, a town of Schalonia, on the river Save, near the borders of Croatia, well peopled and fortified; 132 miles W. of Belgrade. N. lat. 45° 10'. E. long. 17° 50'.

Gradiello, a town of Italy, in the department of the Adda and Oglio; 8 miles S. of Brescia.

Gradista, a town of European Turkey, in Bulgaria, on the borders of Servia; 40 miles S. of Volumn.

Gradisze, a town of Walachia; 48 miles N.E. of Galatz. N. lat. 45° 23'. E. long. 27° 19'.

Graditz, a town of Bohemia, in the circle of Konigigratz; burnt by Ziska; 12 miles N. of Konigigratz.

Gradou, a small island in the gulf of Venice, near the coast of Friuli, with a town which was the first see of the Venetian patriarch. N. lat. 45°. E. long. 13° 17'.

Gradual, Gradual, was an anciently a church-book, containing divers prayers, rehearsed, or sung, after the epistle; called in some of our ancient writers gradile, graduale, graille, &c.

After reading the epistle, the chantor ascended the ambo with his gradual, and rehearsed the prayers, &c. therein; being answered by the choir; whence the name gradual, on account of the steps or degrees of the ambo.

The gradual or graille, which the provincial constitutions of archbishop Winchelsea, made at Merton, A. D. 1305, required to be in every church, was a book containing all that was to be sung by the choir at high mass; the tracts, sequences, alleluias; the creed, offertory, triumfum, and also the office for sprinkling the holy water. "Gradale fæ dictum, a gradualibus in tali libro contenti\-

It is sometimes taken for a mass-book, or part of it, instituted by pope Celestine, anno 430. See flat. 37 Hen. VI. cap. 32.

In the Romish church, gradual is an appellation still given to a verse which they sing after an epistle, and which was anciently rehearsed on the steps of the altar: though Ugutio gives us another account, and says it took its denomination gradual because sung in the gradual accent from note to note. Magri speaks differently still, and will have it to have taken its name because sung while the deacons went up the stairs to the pulpit, to sing the Gospel.

Gradual, Graduale, is also applied to the fifteen psalms, sung among the Hebrews, on the fifteen steps of the temple. Others are rather of opinion that they were thus denominated because the fingers raised their voice by degrees, from the first to the last.

Cardinal Bona, in his treatise of Divine Psalmody, says, the fifteen gradual psalms are intended to represent to the mind, that we only arrive at the perfection of good news, or holiness, by degrees. He goes on to lay down the fifteen degrees of virtue, corresponding to the fifteen psalms: five of them are for beginners; five for proficient; and the rest for the perfect.

Graduate, a person who has the degrees of any faculty: a graduate in physic, in divinity, in music, &c. See Degree, Doctor, &c.

This privilege of graduates is no older than the fifteenth century; it being observed, that men of learning were much neglected by the colleges, and patrons of churches; complaint, therefore, was made to the council of Balsh, where this decree was made; which was afterwards confirmed by the Pragmatic Sanction, and again by the Concord.

Graduation of Astronomical Instruments, is the dividing of a circle, or of some aliquot part thereof, into degrees and its sub-divisions, on the limb of any instrument that is used for measuring angles with a great degree of accuracy. (See the article Degree.) When the instrument to be graduated is of a portable size, admitting of only a small radius of curvature for the limb that is to be divided, the operation is very readily as well as accurately performed by an engine, such as Ramden's or Troughton's, the former of which we have described under the article Engine for dividing Circles, &c. but when the radius of the instrument is too large to admit of division by an engine, the task of graduat- ing, by the determination and adoption of original dividing points or lines, requires no ordinary portion of skill, manual dexterity, and perseverance to be united. Before the esta- blishment of the Royal Observatory at Greenwich, the art of graduating was in a rude state, but a desire to have this institution furnished with superior instruments of observation has stimulated the different astronomers royal, successively, to encourage the talents of superior artists from time to time, till at length such perfection is attained, that little more can now be hoped for in the improvement of our best English instruments. The history of the art of graduating astronomical instruments, and the gradual development of the most convenient and most accurate modes of proceeding, together with the difficulties to be surmounted in the various lags of progress towards perfection, will be best explained by a concise detail of each successive method of dividing, that has been practiced, agreeably to the order of time; and by remarks arising out of each detail, as they most naturally occur.

We know not sufficient of the afroaholios of Hipparchus and Ptolemy to enable us to give satisfactory account of the nature and accuracy of their divisions and sub-divisions, though it is probable that the graduated circles on them contained each 360°, agreeably to the Egyptian mode of dividing the circle. Neither can we give a very perfect de-
GRADUATION.

scription of the manner in which Copernicus, long afterwards, had his astrolabe and meridian quadrant graduated, though we have shown under our article CIRCLE that his parallactical instrument, with which his altitudes were chiefly taken, had its limb divided by equal divisions that were the subtenes of $\frac{1}{3}^\circ$. 176 each.

Tycho Brahe's instruments had the advantage of a long radius, which rendered any inequalities that might exist in his divisions of left value than they would have been in instruments of short radius: the smallest sub-divisions into which he professed to mark his spaces were to each, and the single minutes and portions of a minute, even to 15" and 10", were indicated by triangular diagonals; but with what degree of precision the sub-divisions were effected, and what dependence could be placed on his diagonals, as to accuracy, at this distance of time, it is not an easy matter to ascertain: it is recorded, however, that the operation of graduating his instruments was performed by his own manual labour.

And what we have here said of the instruments of Tycho Brahe, is equally true of the machina celestis of Hevelius; whatever accuracy his apparatus possessed, was the result of his own perceiving industry, but we are not aware that his methods of proceeding have been particularly detailed.

In Dr. Hook's Animadversions on the Machina Celestis of Hevelius, 1674, this very ingenious mechanist has published an account of his method of racking the exterior edge of the limb of his quadrant, as performed by Tampion, which method, he says, "does not at all depend upon the care and diligence of the instrument-maker, in dividing, graving, or numbering the divisions, for the same screw makes it from end to end." But, as Smeaton has very properly observed, this inventive contriver has not given his reader any precautions or particular directions how the perfection of the screw is to be ensured, or how the notches of the rack work are to be rendered perfectly equal among themselves, notwithstanding the unequal densities, and hardness of different portions of the metal to racked. The difficulties alluded to here, were acknowledged by the due de Chaun. in a memoir of the Royal Academy of Sciences at Paris, published in the year 1765. The doctor called the account of his method, "an explanation of the new way of dividing," and as an original invention that may probably be called his own, though the want of a perfect screw, with intervals exactly proportioned to the effective radius of his quadrant, was a source of error, that posterior contrivances were required to remedy. See Engine (by Ramdten) for cutting the screws of the circular dividing engine.

The use of Dr. Hook's screw for racking the limb of an astronomical instrument was not, however, abandoned, without a fair trial of its accuracy in reading the quantity of the angles so measured; for Flamsteed, or (Flamsteed), on his appointment to the Royal Observatory in 1676, employed Tampion to construct him a sextant of six feet nine and a quarter inches radius, at the expense of Jonas Moore, with an endless screw of seventeen threads per inch, acting on the racked edge of the limb, and with telescopic sights, which had not been before used: the result of this trial was, that some shake took place in the notches, that were worn by the screw, and frequently an error of a whole minute in reading another observation was unavoidably produced thereby. To remedy this evil, in the following year degree spaces, with diagonal divisions to read to the accuracy of 16", were added as a check on the measures of the screw, and a column, to contain the check angle by diagonal lines, was filled up from the 11th of September of the year 1677. These additions, it appears, from the Prolegomena of the Historia Celestis, were inferred by Flamsteed himself, and a companion of the screw with the diagonals proved that an error of as much as one minute was frequently the result of the reading by the screw. In an observation of the moon, taken on the 9th of June 1677, Smeaton says, that on looking over the observations, he detected an error of 55', which, upon a radius of six feet nine inches, he calculated amounts to more than $\frac{1}{3}$ th part of an inch. The screw, however, was useful for giving a regular flow motion to the telescopic sights, and though an accurate measure of a large arc, was soon abandoned in astronomical instruments, it has been retained as an excellent mode of producing a flow motion, by the aid of a tapped clamping piece, and has been applied with great success to the limb of a dividing engine, which, being a complete circle, admits of equalization of the contiguous notches, by a long continued simultaneous action of several threads of a very perfect screw, carried many times all round the circle, when the exact situations of distant notches have been asured by the checks afforded by accurate divisions, previously made on its plane.

Notwithstanding what we have above said of the imperfect measurement of an angle by the screw, it was not relinquished without another trial in Flamsteed's time, by Abraham Sharp, his amanuensis, to whose skill and dexterity in manual operations of a mechanical nature both Flamsteed and Smeaton have borne ample testimony: the letter of which Sharp says, "I look upon Mr. Sharp to have been the first perfom that cut accurate and delicate divisions upon astronomical instruments." The instrument at which Sharp laboured, and to which he applied the screw in conjunction with the diagonals of the divided spaces, in 1689, was the mural arc at Greenwich, of which the radius is six feet seven inches and a half. "But yet," says Smeaton, in his paper on this subject, read November 17, 1785, at the Royal Society's room, "whoever compares the different parts of the tables for conversion of the revolutions, and parts of the screw belonging to the mural arc into degrees, minutes, and seconds, with each other, at the same distance from the zenith on different sides, and with their halves, quarters, &c. will find as notable a disagreement of the screw-work from the hand-divisions, as had appeared before in the work of Mr. Tomson, and hence we may conclude, that the method of Dr. Hook, being executed by two such masterly hands as Tampion and Sharp, and found defective, is in reality not to be depended on in nice matters."

This inference of Smeaton obviously implies, that what he calls the hand-divisions of the mural arc, are more accurate than the readings by the screw alone; but, as he has given no other test of the accuracy of these hand-divisions, nor has explained by what process they were inferred, the more legitimate inference would have been, that either the screw, or the hand-divisions may be faulty, or both may be so in their respective degrees. It is to be regretted that Sharp, who was a mathematician as well as a mechanist, has not published the method he adopted of marking out and cutting his dividing lines, which is more immediately the subject of our present article. Had he made his hand-divisions first, and checked his notches, made by the screw, thereby, as Ramden did with his engine afterwards, his measures by the screw would have been more perfect, though the centre-work might have been liable to be called by too much pressure of the screw against the notched edge of the instrument, when frequently used.

Nearly about the time that the mural arc was fixed at Greenwich, Olaus Roemer, the Danish astronomer, supplied his domestic observatory with an instrument that had divisions and telescopic sights moving in the meridian, by means of a long axis, common to both the divided arc and telecope, which
which therefore admitted of better adjustment for the vertical motion than the mural arc was capable of; and which may be considered as the first transit instrument that properly deserves such a name. In dividing his arc, Mr. Roemer dis-regarded the total length, with respect to an exact number of degrees, and looked more particularly to the equality of the divisions, which were convertible into degrees and minutes, by a table calculated for this purpose. The method he made choice of, for rendering his divisions equal, was to begin at one end of his arc, and to proceed by flipp ing, and by marking the dividing points with a proper prefix at each step, till the whole arc was finished; for this purpose he did not depend on a pair of dividers, however strong their legs were, but two line pointed pieces of strong tempered steel were tied, or otherwise fixed together in such a way, that the distance between the two points was 4th or 5th of an inch, and the radius of the arc to be divided was so proportioned, from 2½ to 3 feet, that this distance made a space very nearly equal to 1°; whether exactly so, or not, did not signify, as the difference was allowed for by the calculated table, when an angle had been read by the divided spaces as numbered. It is easy to conceive that this mode of measuring an angle would be as accurate as any other, after the due allowance was made, provided the spaces were perfectly equal to each other; but the theory of this method is more perfect than the practice; for none of the mixed metals is so perfectly uniform in its density, and so free from hard particles, occasionally met with in the flipp ing points, as to ensure the perfect equality of the divided spaces, however carefully the flipp ing points are prefixed in a vertical direction; the smallest deviation on making the first impulsion becomes greater by prehure, and an attempt to rectify any erroneous points can never be depended upon: but, what is worst, every individual deviation from perfect equality is charged on the whole arc, which therefore will be either longer or shorter than the true length, by the aggregate of all the positive, or negative quantities, that predominate in the inequalities of the individual spaces thus divided; and the longer the arc is from the first point, when any angle is measured, the greater is the error of the measurement in all probability, because the greater is the probable aggregate of the deviations from perfect equality in the spaces. The total arc thus divided was about 75°, but Roemer applied no correction to the errors of the distant divisions of this arc, no dependence could be placed on the result of the readings, even when converted into degrees and minutes by his table, which supposed the arc perfectly divided.

The next ingenious artizan who distinguished himself in the art of graduating almanacical instruments, was the celebrated Graham. At the appointment of Dr. Halley to the Royal Observatory of Greenwich, Flamstead's instruments were removed by his executors, and in the year 1725, Graham undertook the construction of a new mural quadrant, which remains as a flaiming proof of his skill, to this day, in the said observatory. This artizan availed himself of every contrivance that had been practised by his predecessors, and invented such a strong, and, at the same time, light method of contriving the frame-work of the iron quadrant, constructed by Jonathan Sisson, as evinced his superior knowledge of mechanics, as well as Sisson's precision in the workmanship. The diagonals were now rejected, as being incapable of being read by a fiducial edge with requisite exactness, and the vernier scale was substituted as much preferable in this respect, and the beam-compas, with equal advantage, was substituted for the rule and dividing knife, which were liable to considerable parallax, notwithstanding the greatest precaution taken in drawing the dividing lines, or in marking the dividing points. The screw for slow motion was also used for dividing the vernier scale in a proper way, after its value was ascertained; and its perfection was insured, with respect to the due inclination of its thread all round, as well as to the equality of their spaces: and hereby, in order that the advantage of continual division might be introduced as a check on the degree spaces, the quadrant was divided in 56 spaces, with sub-divisions, in a separate arc; and the readings from the 96th arc were a constant check of the readings by the 90°, when converted into degrees and minutes by calculation, or by a table used for that purpose.

As it is not our intention to describe here the structure of Graham's quadrant, but merely to describe his method of graduating the limb of French, which was laid over the iron frame, we shall satisfy ourselves by stating that two separate arches were struck by a beam-compas, secured from bending by several brassing pieces; the respective radii of which were 96.85, and 95.84 inches. The inner arch was divided into exact degrees, and twelfth parts of a degree, or spaces; but the outer one was divided, as we have said, into 55 equal parts, and each of these again sub-divided into 16 equal parts, so that the sub-divisions were to each other as 1082: 1536, or in smaller number, as 25: 32. To convey to the reader an idea how the arcs were divided, suppose the quadrant to be represented by fig. 1, of Plate XVIII. of Astronomical Instruments, and that the occult line a b d be required to be divided into degrees by points inferred thereon, as centres for cutting the dividing lines from; the known property of the circle, that the chord of sixty degrees is always equal to the radius, afforded the means of laying down the total arc of 90° in the first place; thus, from the point a, or zero of the arc, the point b was marked by measurement of the fame points of the beam-compas unaltered, that struck the occult line; and this arc of 60° was bisected at c by an extent nearly equal to the chord of 30° from the points a and b respectively; the extent, however, being a trifle less than the chord of 30°, the two sweeps did not intersect each other, but approached so nearly together, that the small space between the sweeping lines was bisected by a point put in by hand, by the assistance of a magnificent eye-glass: the distance of this point c from a or from b being the chord of 30°, was laid along the limb from b to d, the extreme point of the whole arc of 90° and when this operation was so carefully performed, that the arcs a c, c b, and b d were precisely of the same length, when compared with each other, the total arc might safely be depended on, as being of its true dimensions. During this nice operation, it was prejudiced, that the length of the dividing beam had not altered by any variation of temperature. The next step was to bisect each of those three arcs of 30° into fix of 15° each, in the same manner as a b, the arc of 60° was bisected into c and c b: but the arc of 15° were not divisible into a lower number than three parts of each 5°; in order to tripurate each arc of 15°, a separate arc was used, as an arc of trial, defribed from the original radius unaltered, and 15° were transferred to it, and divided by trial till one-third of it was ascertained to measure exactly the distance between the two points of the compas; this distance was then laid off each way from each of the foregoing points of the arcs of 15°, and the second space of each being found equal to their contiguous first and third spaces thus measured, the whole arc was sub-divided into 18 equal arcs of 5° each; in the same manner, a fifth part of one of the arcs of 5°, first transferred upon another part of the arc of trial, was ascertained by repeated adjustments and examinations, and then inserted within the divisions of the arc.
divided arc, by turning the points over twice each way, from every point already laid down, and then the middle space of each five being found equal to the extreme as well as contiguous spaces respectively, the whole arc was subdivided into points of one degree of distance from each other. But to ensure a perfect equality among these spaces required great steadiness of hand, as well as observation of the eye, and caution, to preserve the regular distances of the points, unaltered during the operation. Of course, the marking point was required to be fine, and at the same time well tempered, as well as strong enough to bear pressure, which preface was also necessary to be made in a perpendicular direction on the face of the limb. The sub-divisions of the degree spaces into 12 parts of 5' each, were done first by trisecting, and then by bisection, or \( \text{vide vero} \), in the manner we have already described; and the delity of these operations, on so small a scale, required extraordinary attention and care to ensure perfect equality among the smallest sub-divisions, which were now in a plate to be transferred by lines tending to the centre of the arc to be graduated. This was an operation that could not be done well by the straight edge of the scale, and a marking point, or dividing knife that would be liable to deviate a little, notwithstanding the greatest care; here another, but smaller beam-compasses was sublitted for the ruler, probably for the first time, for the purpose of transferring the graduated points from the occult arc into the arc to be graduated, in the following manner: suppose the points \( g \) and \( h \) to be intended to be transferred; because the lines to be cut, as the dividing lines, are required to be in a direction tending directly towards the centre \( o \) of the concentric arcs, described on the limb; the distance of the cutting point, from the stationary point of the compasses, was taken of such a length, that the cutting point crossed the arc to be cut at right angles; or, in other words, the beam was so situated, as to become a tangent to the arc to be cut; therefore the distance of the two points of the beam was regulated by the distance of the occult line of dots \( a, b, d \), from the arc to be graduated by the straight lines, or rather by the curved lines, which in fact were subdivided, and which passed without sensible error, for straight lines, when the tangent line in question was long. From the point or dot \( g \), the curve \( h \) was drawn, and from the dot \( g \) the curve \( j \) was drawn, but in such a way that a small portion only of each, that lies between the curvilinear lines, was cut on the face of the instrument. In the same manner all the other dots were successively transferred, while each representative of the numerals 5, 10, 15, &c., were made longer than their intermediate lines of division, and the sub-dividing lines were again still shorter. The vernier carried by the telescope, when nicely and accurately divided, would detect any inaccuracy in the sub-divisions thus transferred, by the aid of a magnifier properly adjusted.

The arc of 96 divisions, with their sub-divisions, was not, properly speaking, graduated, but divided and sub-division into portions of smaller value than degrees, and 5' spaces; but as the number chosen is divisible continually by the number two, it was completed by continual bifections, which method therefore requires no further explanation. We are told by Dr. Smith (in his Optics) that these two arcs were never found to differ from each other more than 5" or 6' on any part of the limb, but that when there is such difference, the preference ought to be given to the bifected arc of 96 divisions.

To prove that the spaces obtained by the lines of transfer are equal to those between the corresponding dots or points, let \( e f \) and \( g b \) be joined, also \( e f, o b, o e, \) and \( o g \); and the triangles \( e f, o b, \) will be very nearly similar, and equal to each other; therefore, if the common angle \( e o b \) be taken away from the equal angles \( e o f, g o b, \) the angles \( e o g \) and \( o e b \), that remain, will also be equal to each other.

It does not appear that Graham took any measures to guard against, or even to detect the errors that his method of dividing is liable to, from variations of temperature in his quadrant and beam, during the time that the operation is going on, and from the corresponding variations of length in the metals, according to their respective expansibilities: nor is it quite certain that he was aware of the probable extent of such errors, seeing he constructed the frame-work of his instruments of iron, and had his circle to be divided of brafs. In Dr. Bradley’s zenith sector made by Graham, Dr. Mathewson has caused an iron limb to be subdivided for the original brafs one, and has laid the points of division inferted on itsd of gold, to avoid the errors that arose from the unequal expansibility of the different metals.

We might here mention Mr. H. Hindley’s plan of dividing a circle by a toothed circular plate and endlets ferew in form of an engine, about the year 1746, but that we think his method of dividing and drilling the holes of his plate, by heading a straight flinder bar of brafs into a circle and transferring the holes therfrom, cannot be depended on where much accuracy is required in the divisions of a circle. It was originally intended, and is much better calculated, for dividing and cutting the notches between the teeth of a wheel; but the reader may see the plan described, and some improvements on it propoed by Smewton, in his paper already mentioned, as contained in the Philosophical Transactions of London, in the year 1785.

Jeremiah, the son of Jonathan Sifton, was of Graham’s school of dividing, and did nearly as much justice to the method he adopted, as Graham himself, probably; and his nice care, and persevering almosity, have chiefly him among the few dividers of his time; but we are not aware that he was the inventor of any original contrivance, except, perhaps, that he applied a triple index to some of his instruments, one of which had the vernier, and each of the others had a single line or frorke drawn at onethird of a circle from each other, and from zero of the vernier, which might act as a check on the eccentricity of the circle, as well as on the inequality of its divisions; though it does not appear certain that this was the original intention, as the three props of his vernier-bar in his theodolites required it to be triple; but in his circular indexes one frorke only was made, and that opposive the vernier: the importance of a triple vernier has not been noticed particularly by any one, previously to the time of Mr. Ed. Troughton’s introduction of the triple vernier into his circular instruments. Mr. Ludlam, however, says, that Sifton very early rejected the method of trisecting, and that of fpleving too. Having (by means of the radius and infinituons only) divided his quadrant into three arches of 30 each, he let off in each of these arches the chord of 21° 25', or 25° times five minutes. This chord was taken off 5 a scale of equal parts, and was checked by the chord of 8° 45', both chords together filling up the arch of 30°. The arch of 21° 25' was divided by continual bifections into arches of five minutes each. This description, says Mr. Ludlam, in a note to page 4, of his Introduction and Notes on Mr. Bird’s method of dividing, was given by Jeremiah Sifton, in a private letter dated May 20, 1766; and according to the same letter it appears also, that Sifton placed the fixed or central point of his compass in a blank tangent line, as hereafter described by Bird, during the operation of transferring the divided points into linear divisions; but as Bird has in the year 1767 published these proceedes as originally his own, and as he worked for the Siffons previously to 1766, we are disposed to consider Bird, and not
either of the Siflons, as the real contriver of the methods here adverted to. Siflon (the younger) rejected the arc of 96, as being only a help to a bad divider; but Bird used to retort on him, by saying, that good dividing was not afraid of such a tell of its accuracy.

It is the characteristic of a great genius in mechanics, not to tread too closely in the steps of his predecessor, but, availing himself of any hints that may have been presented to him, to mark out a more direct and even path for himself, that shall throw in his way fewer obstacles to impede his progress. This was the case with Mr. Bird, who, having been brought up a cloth-weaver in the county of Durham, and having noticed some very coarse divisions on the face of a clock that fell in his way, immediately set about dividing one himself, in a much neater manner, and was so pleased with his success, that in the year 1740 he came to London, and was in business for himself as an instrument-maker, only five years afterwards. After having made himself acquainted with the methods at that time in use of dividing a circle, he saw that no one had guarded against the errors produced by the effects of variable temperature on the beam of the compass, as well as on the metal of the scales and circles to be divided; he also saw that bisection of an arc had so much advantage over trisection, or qua
division. That he abandoned the latter modes of dividing altogether, and was the first probably to compute chordlines, to be taken from a good vernier (what he calls numinous) scale, by the beam-compasses, in order to determine such points in an arc of 90°, as may enable a division by continual bisection to be adopted, and at the same time such may be laid down without loss of time, or, in other words, without sensible change of atmospheric temperature.

We cannot better describe Mr. Bird's method of dividing astronomical instruments than by using his own words. "The re
quiftions," says he, "for the performance of this work are as follow: A scale of equal parts, by which the radius may be measured to 0.001 of an inch must be provided. My scale is 90 inches long, each inch divided into 10, contiguous to which are numinous (verniers) divisions, viz. 10.1 inches divided into 100 equal parts, having 0.001 of an inch, and by the assistance of a magnifying glafs, of one inch focal length, a third of 0.001 may be taken off by estimation. "Provide fine beam-compasses, to which magnifying glafes of not more than one inch focal length should be applied. Let the longest beam be sufficient to draw the arcs, and measure the radius; the 2d to measure the chord of 42° 40'; the 3d to measure the chord of 30°; the 4th, 10° 20'; the 5th, 4° 40'; and if a sixth, to measure 1°, be made use of, so much the better. "The radius of the arc of 90° at the points is equal to 95.938 inches, from which the following numbers were computed, viz. 49.605 inches = chord of 30°; 25.6343 inches = chord of 15°; 12.70947 inches = chord of 10° 20'; 7.81866 inches = chord of 4° 40'; and 69.80318 inches = chord of 42° 40'. Having drawn the several arcs, between which the divisions were to be cut, the radius and the lengths of the above chords were taken by the beam-compasses, which, together with the scale, were laid upon the quadrant, where they remained till the next morni
g; during which time the door of the room was kept locked. Before sun-rise I re-measured the radius, which required some correction; the beam being of white fir, and the scale of brass, which probably contracted, while the beam remained unaltered: the other beam-compasses also required correction. Now the quadrant and scale being of the same temperate, the faint arc b d (fig. 2, of Plate XVIII. of Astronomical Instruments,) was struck, and with a very fine prick-punch (pointil) the point a was made; with the same beam-compasses unaltered I laid off from a to r the chord of 60°, making also a fine point: with the chord of 30° a was bisefted in r. Now one point of the beam-compasses containing 60° was fixed in r, and with the other was marked the point r or 90° a mean; with the beam-compasses containing 15°, was bisefted e in a or 75°; from a was laid off the chord of 10° 20'; and from r, 4° 40'; which two last chords joined exactly in g, being the point of 85° 20': now each degree being to be divided into 10 parts, or every 5'; therefore, 85 X 12 + 4 = 1024, a number divisible by continual bisections. The last chord computed was 42° 40', with which a g was bisefted in a; o a g were bisefted by trials: but, whoever undertakes to divide a large quadrant, will do well to compute also the chord of 21° 20'; but for this chord any of the beam-compasses already provided, which will take in the length, may be used. The point g, being formed as above, I proceeded, by continual bisections, till I had the number required, viz. 1024. To fill up the space between g and r, containing 56 divisions, the chord of 64 divisions was laid off from g towards d, and divided like the rest by continual bisections; as was also from a towards b. The points 52°, 69°, 75°, and 90°, fell in without any sensible inequality. "The method which will suffice for giving a general idea of Bird's proceedings, in dividing his aстрonomical instruments; but his method of transferring the divided points into dividing lines was equally original, and guardian also against errors that might arise from the handling of the beam during the operation, by variable temperature; before, however, we proceed to detail this process, it may be proper to observe, that the points made on the faint circle were infected by a pointil, or piece of steel-wire, with a conical point made fall into a piece of cylindrical bras rounded at the upper end: the fleel part was 1/4 of an inch thick, and 2/3d of an inch long, and the bras part 2 3/10 long, and 3/8 of an inch in diameter. The angle of the steel conical point was from 20° to 25°, and the point somewhat above a spring temper, fo that the point made in the circle did not exceed 0.001 of an inch; as it was sharpened on an oil-bone while turning round, and while drawn in a direction outwards from the point itself, the surface partook of the nature of a counter-funk, and, as it were, drilled a diminutive hole of a conical shape when gently pressed on, as it revolved in the point of bisection, which point, by reason of the four angular bars made by the intersecting lines, could be felt as well as seen. The points of the beam-compasses were never made to approach nearer to each other than two or three inches, but at the ends of the arcs spring dividers, with conical points, were substituted to measure small arcs. Another precaution was, that in all bisections, the place to be pointed was laid off from left to right, and then from right to left, from the respective central points. "As the maxim, "that an arc may be bisefted, but not practically trifected or qua\ndisected with certainty," was the maxim adopted by Bird, when he introduced the use of his scale for measuring the chords, so the maxim, "that a right line cannot be cut on bras, so accurately as to pass through two given points, but that a circle may be described from any centre, to pass accurately through a given point," was taken up by him when he adopted the beam-compasses, as Graham and Siflon had done, for cutting the small portions of a circle, instead of perfectly straight lines, as boundaries of the divisions. His plan of doing this, however, was new, as it may be seen from his own words. "The next step," says he, "is to cut the linear divisions from
from the points: the best instrument for this purpose is the beam-compas, having both its points conical and very sharp. Draw a tangent to the arc $bd$, suppose at $r$, it will intercept the arc $xy$ in $g$, this will be the distance between the points of the beam-compas to cut the divisions (nearly) at right angles to the arc $bd$. Lodge that point of the beam-compas next your right hand, in the point $r$, let the other fall freely into the arc $xy$; press gently with your finger upon the fcrew-head that takes the socket (and that is convex), and with the point towards the right hand cut the divisions. In this manner you must proceed with the rest."

The intention of transferring the central or settings point of the compas into a blank tangential line, instead of sufferling the faid point to reft in the respective points made in the faint arc, is, that in the former case shou'd any alteration take place in the length of the beam, during the operation of cutting, no error is charged on the divisions cut, but the alteration is compensated by the distance of the newly made point in the tangential line from the cutting point; that is, each division is charged only with such a minute error, if any, as arises from temperature during the act of cutting a single froke, and if one of the points should break, another may be replaced without inconvenience; whereas, by the method of Graham, a broken point produces considerable difficulty; and the whole error arising from temperature, during the whole process of cutting all the divisions, is charged not only on the total arc, but likewise in a certain undefined degree on each of the whole divisions. This idea of getting quit of the effects of temperature is ingenious, but has been objected to as liable to the ill effects of flapping in a certain degree, inasmuch as that a hard particle, lying under the point of the froke, may cause a little deviation in the divisions before the froke is cut. This objection, however, was not allowed to be realized by Bird, who no doubt must have obviated it by some other plan, had he found any real inconvenience arising from it. Great care, notwithstanding, must have been taken in fettling down, and prefing on the point at the froke in a perpendicular direction. Another objection applied to Mr. Bird's scale, from which the chord-lines were measured, inasmuch as the scale itself might be erroneous in fome places, and would impart its errors to the arcs measured from the computed chords taken therefrom.

Besides the arc of 90°, the mural arc by Bird had an arc of 90° divifions, like Graham's, divided by continual bifects, till each of the 90° divifions had 16 sub-divifions, as a check on the accuracy of the arc of degrees; but subsequent divifors of astronomical instruments have found this superfluous, as being in the opinion of others, as well as Jeremiah Sifton, a check only on bad dividing, and as rendering the reduction of observations troublesome, when made thereby.

The vernier was retained by Bird as the best method he knew of sub-dividing the 5′ spaces into quantities of 30″ each, which was the smallest angle he profefled to measure; and to effect his purpose he made ten divisions on his vernier equal to eleven on the limb of the instrument, firit by computing the chord of thirty-two parts, and then by taking ten out of those parts, when bifected, as the proper divifors for the vernier; there, being made in points, were also transferred by a tangential line into linear divifions by the beam-compas, as before deferibed; but great care was taken, that the froke zero on the vernier was drawn from the quadrant's centre, precifely parallel to the line of collimation of the telecope. Mr. Ludlam fays, that the cutting-point which Sifton used was flat in the knife-edge form, but that Bird's was a triangular prism, with a flope ground down to a point at one of the angles; which formed the cutting-point.

At the requell of the commiffioners of the Board of Longitude, Mr. Bird, in the year 1767, published his method of dividing in a quarto pamphlet, for which they rewarded him with 500L. besides 65L. for his plates, after having bound them to confull an expenditure of five years in the art of constructing and dividing astronomical instruments.

Mr. Sweaton is of opinion that Bird's method of dividing may be improved in one repect, and expresses himfelf on the fubjeft thus: "I muft here obferve that I apprehend no quadrant, that has ever undergone a severe examination, has been found to form a perfect arch of 90°, nor is it at all neceffary it should; the perfect equality of the divifions throughout the whole is the firft and primary consideration; as the proportion of error, when ascertained by proper obfervations, can be as easily and readily applied when the whole error of the rectangle is fifteen feconds, as when it is but five. In this view, from the radius taken, I would compute the chord of 16′ only. If I had an excellent plain fcale, I would ufe it, because I fhould expect the deviation from the right angle to be lefs than if taken from a fcale of more moderate accuracy; but if not, the equality of the divifions would not be afcertained, though taken from any common diagonal fcale. This chord, so prepared, I would lay off five times in succession, from the primary point of 0 given, which would compleat 90°; I would then bifect each of thoae arches of 16′, as prefcribed by Mr. Bird, and laying off one of them beyond the 80th, would give the 88th degree, proceeding then by bifection, till I came to an arch of 2′, laying that off from the 88th degree, would give the point of 90°. Proceeding still by bifection, till I had reduced the degrees into quarters of 15′ each, I would there flop, as from experience I know that when divifions are over clofe, the accuracy of them, even by bifects, cannot be fo well attained, as where they are moderately large. If a space of 2′ths of an inch, which is a quarter of a degree, upon an eight feet radius, is thought too large an interval to draw the index over by the micro-meter fcrew, this may be shortened by placing another line, at the divifion of one-third of a division on each side of the index line, in which cafe the fcrew will never have to move the index plate more than one-third of a division, or 5′, and the perfect equality of thofe index lines from the index line may be obferved, and adjusted to 5′ precisely, by putting each of the fide lines upon a little plate, capable of adjufment to its true divifion from the middle one, by an adjufing fcrew. The above hint is not confined to the chord of 16′, which prohibits the sub-divifion going lower than 15′; for if it be required to have divifions equivalent to 5′ upon the limb itself, then I would compute the chord of 21 20′ only; and laying it off four times from the primary point, the limit would mark out the divifion 85′ 20′; pointed out by Mr. Bird, supplying the remainder to a quadrant from the bifected divifions as they arise, and not by the application of other computed chords." Mr. Sweaton, fufficiently, however, that this method of laying 16 five times over, or 21 20′ four times over, may be objected to, as liable to the errors of biflapping, arising from Römer's method, afterwards proposed to lay down the chord of 64′, or of 85′ 20′, from computation all at once, and then to bifect, and complete the quadrant from the bifected divifions, which Mr. Bird himfelf prefcribed as a good method for Hadley's extants and octants. But thefe plans are nowuperfeded for instruments of small radius by the dividing engines, which performs the work with great expedition, as well as accuracy, and the original methods of dividing the circle are only useful for the larger
larger instruments, and for the finishing of the dividing engines themselves.

In the year after Mr. Bird had published an account of his method of dividing astronomical instruments, the duc de Chaumnes printed in French a folio work, entitled "Nouvelle methode pour diviser les instrumens de Mathematique et d'Astronomie," and also a work proper to be bound with the former, called "Description d'un Microscope et de differens Micrometres determines a mesurer des parties circulaire du droites avec la plus grande precision." The former of these pamphlets contains 15 plates, and the latter fix, which exhibit plans and drawings in different points of view of all the apparatus, both in pieces and together; these are not necessary to be copied by us, but we will desribe them as far as they fall within our present purpoise. This new method of dividing is performed by the affillance of compound microscopes, with crofs hairs in the focus of the eye-glafs of each, to be fixed to the circle to be divided in any given situation, and of moveable pieces of brafs with fine dividing lines marked thereon, which may be so fixed with wax, as to be adjustable to the point of interfection in the focus of any of the microscopes, and when duly adjusted, a dividing pointil, moving in a complex frame of brafs, cuts the line, on the circle to be divided, that shall correspond to the point of the circle where the adjustable division is fixed; though the line cut is not in the fame part of the circle. As this method may be considered as the ground-work of Rawlifs method of dividing a large circle, and has not, that we know of, been translated into our language, we will give the substance of that part of the work which more immediately relates to our present subjeft, without following the author through all his minute details. The circle, which the duc de Chaumnes proposes to divide by his original method, is the table of his dividing engine, but as it is equally applicable to any circle that may be fixed concentrically on it, we will fuppole it an astronomical circle for altitudes or azimuths that is to be divided by his method. In the firft place, he propofes to have from 30 to 40 thin pieces of smooth brafs about one-third of an inch long, and one-sixth broad, having each a fine stroke drawn acrofs, perpendicular to the long fides and just deep enough to be been; and secondly, three compound microscopes are to be provided, one to be fixed diametrically oppofite the pointil, or cutting point, that is carried in and out, i.e. towards and from the centre of the circle by an adjustable frame, and the other two are adjustable to any given points along the plane of the circle to be divided. When the circular lines are struck on, the adjustable microscopes, which we will call A and B, are placed as oppofite to each other, in a diametrical line, as can be gufed, or roughly measured by any of the ordinary means, and a moveable division on a piece of brafs already defcribed, is put by means of wax under each of the two microscopes, and moved by hand, till the lines, which must be in a radial direction, fall respectively under the centres or interfection points of the fields of view; these microscopes, it muft be understood, are fixed, not on the table which bears the circle, and which is made fo as to re- volve on a long vertical axis, but on a fixed or stationary frame, that is unconnected with the table itself, when the table is at liberty to revolve; suppose now the table and circle on it to be carried half round, while the microscopes remain fixed, in such a way that the moveable division which was under the microscope A, falls under the centre of microscope B; in this situation, if the moveable division falls under the centre of A, the circle is truly bi-fected; but as this is not likely to be the cafe at the firft trial, the quantity that is over or short must be adjusted, one half by the moveable division, and the other by the mi croscope, and the operation of reverting muft be repeated, and the refifitions made, till the circle is found to be truly bi fectioned, both backwards and forwards, by the coincidence of the divisions with the interfection points in each focus of the microscopes. The two microscopes A and B may now be removed, and the third or fixed microscope must be made fast over one of thefe two dividing strokes, after the pointil has been brought precisely to occupy the place of the other, in which situation the pointil and the fixed microscope will f品格 to diametrically oppofite each other, that whenever an available line is brought to bi-fect the field of view of this microscope, the pointil will be ready to cut a line on the opposite fide of the circle, and whenever a fet of adjuilable divisions are properly placed, by the wax, on one femi-circle, the lines in the other femi-circle, directly oppofite thefe re- spectively, can be permanently cut, before the moveable pieces are taken off, and afterwards the faid lines for cut may be brought fuccefsively under the fixed microscope, in order that their oppofites, where the moveable pieces were ftruck on, may, in like manner, be cut; fo that one-half of the circle will be fufficient to be divided and sub-divided by the adjustable pieces, feeing that each of its divisions and sub-divisions, brought in fucceffion under the fixed microscope, may be ini- niately transferred by the pointil, into the oppofite femi-circle, and also thefe in their turn transferred back again. Let us now fee how the femi-circle is divided and sub-divided by means of the two microscopes A and the fixed one, B being no longer wanted; the furf operation is the tritction of it into arcs of each 60°; for this purpoife, while the pointil remains at T, (fig. 3. of Plate XVII.) one of the points cut, viz. at 180°, and the fixed microscope rests at Z, or zero, i.e. the firft point of the circle, to be f变得 0 or 360°; two moveable pieces are ftracted on at C and D reprefeftively, fo as to tritect the femi-circle Z B T very nearly, and the microfcope A is placed directly over C, fo as to view it; stroke or line at the point of interfection in the focus of the eye-glafs; there it is made falt for the prefent; the line C is now brought under the fixed microfcope at zero, by making the circle revolve, and fuffered to remain; the piece D has its stroke put under the microfcope A, as before was the cafe with piece C, now at zero; the circle is again made to re- volve till the froke of D is under the fixed microfcope at zero; in this situation the point T, or 180°, will have been brought forward 120°, or 60° twice over; provided the pieces C and D were truly placed, and in this cafe an eye, looking into the microfcope A, will fée this dividing line bi-fect the field of view; but as this is not likely to happen at the firl trial, the microfcope must be moved one third of the error now fiewn, and each of the pieces C and D another third, accordingly as the portions of the femi-circles Z C, C D, and D T taken together, are found to be more or lefs than an exact femi-circle. The operation we have defcribed is repeated again and again, till the three equidiftant arcs amount to an exact femi-circle; after which they are rendered permanent, by strokes made fucceffively on the oppofite femi-circle, at the points z and l/, which trit- fect the femi-circle T A Z, when the adjuilable strokes C and D are in fucceffion exactly fixed in the centre of the field of view of the fixed microfcope. The distance between the two microscopes, which is here 60°, is called the opening of the microscopes, which are considered as the two points of a pair of dividers, and the arc between them is therefore denominated accordingly.

The next step is to bi-fect the arcs of 60° each, into two of 30°, by an opening of 30°; to do this one moveable piece, ftruck at the middle of each arc of 60°, will be requisite, and the
the two halves, to the right and left of each piece, may be examined and adjusted till the bisections are complete, and in a flate to be transferred into the opposite semi-circle; for instance, suppose the arc of 60° from Z to C to be biseected, put a moveable stroke at 30°, more or less, and place the microscope A over it; make the table and circle revolve till this stroke 30° falls under the fixed microscope B; in that situation, the whole space ought to be biseected the field of view of microscope A, and whatever the deviation may be, plus or minus, it must be adjusted by trial, partly by moving the microscope A, and partly by moving the piece with the stroke on at 30°, when brought back again under the microscope A. In the same way, any other bisection may be made within the possible opening of the microscopes. Again, the arcs of 30° are trisected, as before described, into arcs of 10°, which are all transferred into the opposite semi-circle in succession.

With respect to the division of the arcs into smaller quantities than those of 10°, where the microscopes approach too near together to admit of the necessary adjustments, an ingenious mode of sub-dividing is adopted by a property of the number 9, thus: having all the arcs of 10° in the semi-circle laid down, the points 90° and 108° are of course among them, and these are divisible by 9, an opening of nine degrees is taken by trial, which repeated ten times, by means of the moveable strokes, will reach from 0 to 90°, when properly adjusted; besides the 10°, 20°, 30°, &c. there will now be 9°, 18°, 27°, &c. up to 90°, and also 99°, 108°, 117°, &c. up to 180°, and the differences of spaces left as the divisions obtained from 10°, and those from 9° repeated, will be respectively 1°, 3°, 5°, &c. up to 9°; now, if the points 9°, 18°, 27°, &c. which numbers decrease by unity in the units place, be made in succession points of commencement, for the arc of 10° to be repeated from, they will from 9° produce 19°, 29°, 39°, &c.; from 18° they will give 28°, 38°, 48°, &c.; and from 27° they will give 37°, 47°, 57°, &c. and so on, till all the single degrees are put on by the arc of 10° thus applied from the points derived from 9° and its multiples. The work is performed thus: make the opening of the microscopes again 10°, by fixing the one called A at the tenth degree when zero is at the fixed one, then turn the table and superimposed circle to be divided till the stroke 9° comes to zero, then a moveable piece flack properly under A will be 19°, bring this to the fixed microscope, and the place for 29° will be had for the next stroke, under A again; and in like manner every individual degree may be marked in succession, by taking stroke ending with 8, after stroke ending with 9 have gone through; and after that, stroke ending with 7, with 6, with 5, &c. till all the numerals are included. If the circle is large enough to admit of division to 5° by the opening of the microscopes, the numbers 4 and 5 may be substituted with advantage for 9 and 10, and then the opening may be 20° for inserting them, instead of 10°, as in the mode we have described. When half degrees are required to be inserted 15° may be biseected, and the line obtained will be in the middle between 7 and 8°, from which stroke, with an opening of 15°, all the other half degrees may be marked as before, by the aid of the adjustable marks to be transferred afterwards into the opposite semi-circle, and all the strokes in that semi-circle may then be transferred back again permanently, so as to complete the circle.

The use of the numerals nine and ten, or of the four and five, is evidently borrowed from Clausius the Jesuit, whose problem for thus dividing a right line, or arc of a circle, was published in 1611.

Another method of sub-dividing the circle, when marked into degrees, as above described, is also proposed as being less tedious, and capable of carrying the sub-divisions to a lower denomination; thus, a socket is made to fit the arbor of the revolving table that carries the circle to be divided, so tight, that it will revolve with the said arbor, or without it, as the case may be. When the socket a telescope is fixed with a vertical hair in the focus of its eyepiece, that may bifect any distant mark to which it may be directed, then a long ruler, of six or seven feet in length, is divided, for instance, into twelve equal parts, so that it may be read distinctly; the distance of this ruler is so adjusted from the telescope, that when placed at right angles to the line of collimation, it may just subtend one degree, which may be first calculated nearly, and then adjusted by trial, till the run of the telescope over the twelve marks of the ruler be exactly corresponding to the run of one degree of the circle under one of the microscopes. In this situation of things, the divisions of the ruler, as seen through the telescope, are, with great care and steadiness, transferred in succession, not to one of the degree spaces itself on the circle, but to a pattern-piece of bracps, which may be afterwards fitted with the object lens of the fixed microscope, fo as to be applied in succession to each separate degree, as the circle is made to revolve, during the operation of transferring these five minute spaces, to the opposite parts of the circle, by means of the pointillr. In strictness, the ruler, viewed through the telescope, ought to be a portion of a circle; but the arc and the chord of one degree are so nearly alike, that one may be substituted for the other, without sensible error. When small circles, or parts of a circle, were propounded by the due de Chaulnes to be divided, they were fixed on the revolving arbor of the table, and the microscopes and cutting point were so arranged, that the divisions of a large divided circle were transferred to the small one in succession, and the whole apparatus, as arranged, constituted an engine for dividing; but the work could not be performed with such expedition as with our modern engines, where stops are substituted for the microscopes, and where the touch has greatly the advantage over the sight. With respect to the accuracy of the work performed by the due de Chaulnes, we are greatly inclined to believe, that the sliding mechanism of the cutting-point would not secure the strokes from having a deviating direction sometimes, arising from the necessity that the sliding parts must have had to admit of free motion, unless, indeed, the parts of action were fitted with extreme nicety.

Lastly, the vernier scale was retained by the author before us, as the belt sub-divider of the 5° spaces, or other small divisions; but he has not conceived it necessary to explain, in detail, how he proportioned it to the divisions of his circle, though it is easy to conceive how this may be done by the help of microscopes and the cutting-point. Our remark on this original method of dividing is, that it shows great ingenuity; but we conceive, that making an equality in the divided and sub-divided arcs will not always ensure perfection in the Angular measures, because the axis of motion may be out of the centre of the divided circle, and the eccentricity will neither be detected by this method, nor allowed for in the divisions and sub-divisions, unless, indeed, two or three equidistant verniers were used for taking an average of the readings from different sides of the circle. It is somewhat remarkable that the same thought that introduced the microscopes for measuring the arcs to be divided, did not substitute them for the vernier, in reading off small quantities of a sub-division when an instrument was finished; which practice was left for Mr. Ramsden afterwards to adopt. The second semi-circle, being only the copy of a
copy, renders this method of dividing less worthy of imitation, as an original method, than it would have been if the imperfections of the first portion of the circle had not been necessarily transferred to the other, and from that back again. In short, we think the wax-work might have been better employed.

The elder Troughton (Jolin) whose dividing was acknowledged to be equal to that of any of his predecessors, or contemporaries, used the beam-compasses, like Bird, but rejected the computation of chords, and the measures taken from scales, as being liable to uncertainty in determining the primary points from which the bifections were to proceed. After having described his circle, or rather quadrantal arc to be divided, he determined the point 60' with the radius, as Graham and Bird had previously done; and, having bifected it at 90°, let off 30' in addition to the 60° to complete the arc of 90°; he then bifected till he had arcs of 15°, and again till he had 75° in each division: the two marks nearest to 90° were now 82° 30' and 86° 15'; but the point 85° 20', or limit of the largest bifacional arc, lay between these two, and could not be obtained by further bifections; the space between the two marks in question was therefore trifected, and the more forward of the two new points was 85° 8'; again, the space between this mark of 85° 8' and that of 86° 15' was trifected; from which came 85° 25', as denoted by the more backward of the two new marks; and lastly, a fifth part of one of the sub-divided arcs was let backwards from 85° 25', to 85° 20', the point from which the 1024 divisions were incepted from 0 entirely by bifections. The quadrantal arc was then completed from the sub-divisions thus obtained. It may be necessary, however, to observe, that the marks at first made by the radius, bifections, triflections, &c. were none of them permitted to be permanent, being of no further use than to ascertain the individual point 85° 20', from which the subseuent biflections were to commence. This method is considered as being preferable to Bird's method of computing the chords and using the scale, inasmuch as it does not depend on secondary or auxiliary means of ascertaining the primary point in the bifacional arc. It has uniformity of means to recommend it in preference to those mixed methods that depend partly upon computation, and partly upon the extended radius.

The method of dividing a large circle, commonly known by the appellation of Ramflclin's method, or the method of drawing, confits of Bird's method, and of that proposed by the duc de Chaunlnes united: the circle is first divided by the beam-companiss into primary points; and the true situation of each of these points is ascertained by opposite microscopes, as the work proceeds, and is rectified accordingly, by pulling the points forward or backward a tripe, till they are in their true places. This method, now generally prac-
tified by all the best dividers, except the present Mr. Troughton, has not, that we know of, been very particularly described, with references to drawings, &c. though it is capable of considerable accuracy in the hands of a good workman, who has perseverance en Ens to do justice to it. The great number of points that will require to be rectified, will, notwithstanding the utmost precaution, render the work irregular in its appearance, and a circular line must necessarily pass through the centre of all the points or conical holes, to render them concentric; besides, the bifecional arcs deform the conical shape of the points, by passing through them, and the subflequent erasures must leave an unevenness in the metal that cannot but offend a nice eye.

Sir George Sluckburgh, in his paper on the equatorial, calls the points that have been enlarged by rectification, and burnished level again, "doubtful or bad points;" and these bear a considerable proportion to the whole. "It would," says Mr. Troughton, "be a great improvement of this method to divide the whole by hand at once, and afterwards to correct the whole; for a dot, forced to its place, as above, will seldom allow the compass-point to rest in the centre of its apparent area; therefore, other dots made from those will scarcely ever be found in their true places. This improvement also prevents the corrected dots from being injured or moved by the future application of the compasses, no such application being necessary."

The circle that is divided by this method is placed horizontally to have its first points made, after it has had its circle described from a revolution on its own axis, and then it is placed vertically in a frame, in which it revolves, and which carries the microscopes with micrometers, that subdivide, and read to the accuracy of one second, in order that the semi-circles, taken from any given opposite points, may have their equality ascertained, or their deviation therefrom determined previously to final rectification. In these operations great attention is paid to the temperature of the whole of the metallic parts employed in the work.

Mr. Ed. Troughton has deviated from the beaten track of his predecessors, and made a road for himself, (probably before Ramflsl's plan was adopted,) that he has trodden with great success, and which he has fully described in a paper of the Philosophical Transactions of the year 1819, which gained him Copley's medal. The reason that caused him to think for himself on this subject, as he has done successfully on many others, seems to have been this: "With as steady a hand, and as good an eye," says he, "as young men generally have, I was much disappointed at finding, that after having made two points, neat and small to my liking, I could not bifect the distance between them without enlarging, displacing, or deforming them with the points of the compasses."

This discovery led to the abandonment of the beam-compasses and ironing-dividers, and, the art of turning appearing to have approached the nearness to perfection of any of the mechanical arts, a roller was thought of, which by its revolutions might sub-divide the circumference of a circle rolled over, after the ratio of their respective diameters was ascertained and properly adjusted. When this speculation was first attempted to be realized, some circumstances occurred which could not be certainly inferred from reasoning, a priori, from known data, but of which a perfect knowledge was necessary for the consummation of the project; in the first place, it was found on trial, that however smooth the surfaces of the circle and roller were made, there was no slippery action, as might have been expected, but the points of contact acted with each other in an apparatus like that hereafter to be described, as the teeth of wheel-work of indefinitely small dimensions; the certainty of this kind of action was an indispensable condition; secondly, notwithstanding this flabbyness in the motion of the roller, it was found to measure different portions of the metallic circle with different degrees of accuracy, some of the measures being a tripe plus, and others minus, with respect to the truth: this want of accuracy, which, as we have said, did not depend on any sliding of the roller, was expected to take place previously, in a certain undefined degree, by reason of the unequal density of hammered materials, and of their consequent unequal porosity; but thirdly, though there was found to be a deviation from true measurement in indivi-

dual
dual portions of the circle; yet, when the roller was properly adjusted to measure the whole circle without a remainder, it was found to possess the desirable property of accommodating itself to the same track again, as often as the circuit was repeated, and consequently arriving at the point zero again without the least sensible deviation. This circumstance, which may be considered as a phenomenon in mechanics, reproduced the hope of success, which the want of perfect regularity in measuring the intermediate portions of the circle was calculated to discourage; and a remedy, hereafter described, was successfully employed to equalize the measurements, nay, so exactly was the course of the roller found to be identical in the same point in every part of its circuit, that, when duly adjusted for diameter, the deviation at any individual point, from the first measure, would not exceed a second. This uniformity in the mode of the roller's travelling furnished the means of correcting its own inaccuracies of measurement, seeing that these inaccuracies, once ascertained, always remained the same at the same points of the circle, provided that zero of the roller started from zero of the circle, at the commencement of its first circuit. We cannot convey an adequate conception of the mechanical application of a roller to the division and sub-division of a circular instrument, without a reference to drawings of the apparatus actually used; nor can we describe that apparatus better than in the words of the author himself. The instrument, of which he has described the graduation, is a four feet meridian circle, at present the property of Stephen Greenbridge, esq. of Blackburn.

"The surface of the circle, which is to receive the divisions," says Mr. Troughton, "as well as its inner and outer edges, but especially the latter, should be turned in the most exact and careful manner; the reason for which will be better understood when we come to describe the mode of applying the roller: and as no projection can be admitted beyond the limb, if the telecope, as is generally the case, be longer than the diameter, those parts which extend further must be so applied, that they may be removed during the operation of dividing." Plates XIX. and XX. of Astronomical Instruments exhibit the principal parts of the apparatus; fig. 1 shows the plan, and fig. 4, the elevation of the revolving parts of the mechanism, in both of which the name letters of reference are affixed to corresponding parts, and both are drawn to a scale of half dimensions. A A is a part of the circle, the surface of which is seen in the plan, and the edge in the elevation. B B B is the main plate of the apparatus, reposing with its four feet A A A A, upon the surface of the arc; these feet, being fixed, may be adjusted so as to take equal shares of the weight, and then are flattened by nuts below the plates, as shown in fig. 4. C C and D D are two similar plates, each attached to the main plate, one above, and the other below, by four pillars; and in them are centered the ends of the axis of the roller E. F F and G G are two friction wheels, the latter firmly fastened to B, but the former is fixed in an adjustable frame, by means of which adjustment these wheels and the roller E may be made to prefs, the former on the interior, and the latter on the exterior edge of the circle, with an equal and convenient force; namely, by the bending of the pillars of the secondary frame, and of the axis of the roller. At the extremities of the axis of the roller, and attached to the middle of the plates C and D, are two bridges, having a screw in each, by means of which an adjustment is procured for raising or lowering the roller respecting the edge of the circle, whereby the former having its diameter at the upper edge about .001 of an inch greater than at the lower edge, on account of its being a little conical, may easily be brought to the position where it will measure the proper portion of the circle.

Much experience and thought upon the subject have taught me, that the roller should be equal to one-sixteenth part of the circle to be divided, or that it should revolve once in 22° 30', and that the roller itself should be divided into sixteen parts, no matter whether with absolute truth, for accuracy is not at all essential here. Each of such divisions of the roller will correspond with an angle of 1° 24' 22', or 1/16th part of the circle. This number of principal divisions was chosen, on account of its being capable of continual bifects, but they do not fail in with the ultimate divisions of the circle, which are intended to be equal to 5 each.

The next thing to be considered is, how to make the roller measure the circle. As two microscopes are here necessary, and those which I use are very simple, I will in this place give a description of them. Fig. 3 is a section of the full size, and sufficiently explains their construction, and the position of the glasses; but the micrometer part, and manner of mounting it, are better shewn at H in figs. 1 and 4. The micrometer part consists of an oblong square frame, which is folded into a slit, cut at right angles in the main tube; another similar piece, nicely fitted into the former, and having a small motion at right angles to the axis of the microscope, has at one end a cylindrical guide-pin, and at the other a micrometer scale; a spring of steel wire is also applied, as seen in the section, to prevent play, by keeping the head of the micrometer in close contact with the fixed frame. This head is divided into one hundred parts, which are numbered each way to fifty; the use of which will be shewn hereafter. A fine wire is stretched across the moveable frame, for the purpose of bifecting fine dots. Two of these microscopes are necessary; also a third, which needs not have the divided head, and which must have in the moveable frame two wires crossing each other at an angle of about 30°; this microscope is shewn at 1, fig. 1. In the two first micrometers a division of the head is of the value of about .0".2, and the power and distinctness such, that when great care is taken, a much greater error than to the amount of one of these divisions cannot well be committed in setting the wire across the image of a well-made dot. The double eye-glasses has a motion by hand, for producing distinct vision of the wire; and distinct vision of the dots is procured by a similar adjustment of the whole microscope. The first step towards fixing the roller is to compute its diameter according to the measure of the circle, and to reduce it agreeably thence, care being taken to leave it a small quantity too large. The second step is, after having brought the roller into its place in the plate B B, to make a mark upon the surface of the circle, near the edge, and a similar one upon the roller, exactly opposite each other; then carry the apparatus forward with a steady hand, until the roller has made sixteen revolutions; if now the mark upon the roller, by having over-reached the one upon the circle, shews it to be much too large, take it out of the frame, and reduce it by turning accordingly; when, by repeating this, it is found to be very near, it may be turned about .001 of an inch smaller on the lower edge, and so far its preparation is completed. The third and final step is the use and adaptation of the two microscopes; one of these must take its position at H in fig. 1, viewing a small well-defined dot made for the purpose on the circle; the other, not represented in the figure, must also be fixed to the main plate of fig. 1, as near to the former as possible, but viewing one of the divisions on the roller with a due attention to each microscope, it will now be seen to the
the greatest exactness, when, by raising or depressing the roller, its commensurate diameter is found. 

Fig. 5. is a representation of the apparatus for transferring the divisions of the roller to the circle. It consists of two slender bars, which, being seen edgewise in the figure, have only the appearance of narrow lines; but looked at from above, they resemble the letter A. They are fastened to the main frame, as at W and Z, by short pillars, having also the off leg of the angle secured in the same manner; Y is a fine conical feeler point for making the dots, and X is a roller, whereby the point Y may be preffed down with an uniform force, which force may be adjusted, by bending the end of the bar jutt above the point, so as to make the dots of the proper size. The point Y yields most readily to a perpen dicular action, but is amply secured against any eccentric or lateral deviation.

The apparatus so far described, is complete for laying the foundation, i.e. for making 256 primary dots; no matter whether with perfect truth or not, as was said respecting the divisions of the roller; precision in either is not to be expected, nor wished for; but it is of some importance that they should be all of the same size, concentric, small, and round. They should occupy a position very near the extreme border of the circle, as well to give the greatest radius possible, as that there should be room for the stationery microscope, and other mechanism to be described hereafter.

It must be noticed that there is a clamp and adjusting screw attached to the main plate of fig. 1, by which it is placed in no respect from the usual contrivances for quick and slow motion (see Circle), it has been judged unnecessary to incumber the drawing with it.

Now the roller having been adjusted, with one microscope H upon its proper dot on the circle, and the other microscope at the first division on the roller, place the apparatus of fig. 5, so that the dotting point Y may fland directly over the place which is designed for the beginning of the divisions. In this position of things, let the feeder X be preffed down, until its lower end comes in contact with the circle; this will carry down the point, and make the first impression, or primary dot, upon the circle; unclamp the apparatus, and carry it forwards by hand, until another division of the roller comes near the wire of the microscope; then clamp it, and with the screw-motion make the con centric dot, proceed in this manner until the whole round is completed.

From these 256 erroneous divisions, by a certain course of examination, and by computation, to ascertain their absolute and individual errors, and to form these errors into convenient tables, is the next part of the process, and makes a very important branch of my method of dividing.

The apparatus must now be taken off, and the circle mounted in the same manner, that it will be in the observatory. The two microscopes, which have divided heads, must also be firmly fixed to the support of the instrument, on opposite sides, and then wires brought to the point first dot, and the one which should be 180° different. Now the microscopes remaining fixed, turn the circle half round, or until the first microscope coincides with the opposite dot; and if the other microscope be exactly at the other dot, it is obvious that these dots are 180° apart, or in the true diameter of the circle; and, if they disagree, it is obvious that half the quantity by which they disagree, as measured by the divisions of the micrometer head, is the error of the opposite division; for the quantity measured is that by which the greater portion of the circle exceeds the less. It is convenient to note these errors + or -, as the dots are found to forward or too backward, according to the numbering of the degrees; and, for the purpose of distinguishing the + and - errors, the heads, as mentioned before, are numbered backwards and forwards to fifty. One of the microscopes remaining as before, remove the other to a position at right angles; and, considering for the present both the former dots to be true, examine the others by them; i.e. as before, try by the micrometer how many divisions of the head the greater half of the semi-circle exceeds the less, and note half the quantity + or - as before, and do the fame for the other semi-circle. One of the micrometers must now be set at an angle of 45° with the other, and half the differences of the two parts of each of the four quadrants registered with their respective signs. When the circle is a vertical one, as in the present instance, it is much the best to proceed so far in the examination with it in that position, for fear of any general bending or spring of the figure; but for the examination of smaller arcs than 45°, it will be perfectly safe and more convenient to have it horizontal; because the dividing apparatus will then carry the micrometers, several perceptions being made in the plate B for the limb to be seen through at proper intervals. The micrometers must now be placed at a distance of 2°, 3°, and the half differences of the parts of the all of the arc of 45° measured and noted as before; thus deducing by bincctions to it 15°, 30°, and 45°. Half this half quantity is too small to allow the micrometers to be brought near enough; but it will have the desired effect if they are placed at that quantity and its half, i.e. 4° 1' 37° 57°, in which case the examination, instead of being made at the next, will take place at the next division but one, to that which is the subject of trial. During the whole of the time that the examination is made, all the dots, except the one under examination, are for the present supped to be in their true places; and the only thing in this most important part of the business, from first to last, is to ascertain with the utmost care, in divisions of the micro scope head, how much one of the parts of the interval under examination exceeds the other, and carefully to tabulate the half of their difference.

I will suppose that every one who attempts to divide a large astronomical instrument, will have it engraved first. Dividing is a most delicate operation, and every coarser one should precede it. Besides its being numbered in a particular useful to distinguish one dot from another; thus in the two annexed tables of errors, the side columns give significant names to every dot in terms of its value to the nearest tenth of a degree, and the misplacing of one for another is rendered nearly impossible.

The foregoing examination furnishes materials for the construction of the table of half differences, or apparent errors. The first line of this table consists of two varieties; i.e. the micrometers were at 180° distance for obtaining the numbers which fill the columns of the first and third quadrants; and at 90° for those of the second and fourth quadrants. The third variety makes one line, and was obtained with a distance of 45°; the fourth consists of two lines, with a distance of 2° 30°; the fifth of four lines, with a distance of 1° 18'; the sixth of eight lines, with a distance of 5° 37° 50°; the seventh of sixteen lines, with a distance of 2° 48° 44°; and the eighth and last variety, being the remainder of the table, consists of thirty-two lines, and was obtained with a distance of 4° 15° 27°.

The table of apparent errors or half differences, just explained, furnishes data for computing the table of real errors. The rule is this: Let a be the real error of the preceding dot, and b that of the following one, and e the apparent error,
error, taken from the table of half differences, of the dot
under investigation; then is \( a + b + c = \) its real error.

But as this simple expression may not be so generally
understood by workmen as I would wish, it may be necessary to
say the same thing less conically. If the real errors of the preceding
dot and following dots are both + or both - , take
half their sum, and prefix thereto their common sign; but if
one of them is + and the other -, take half their differ-
ence, prefixing the sign of the greater quantity; again, if
the apparent error of the dot under investigation has the
same sign of the quantity found above, give to their sum the
common sign for the real error; but if their signs are con-
trary, give to their difference the sign of the greater for the
real error. I add a few examples.

**Example 1.**

For the first point of the second quadrant.

| Real error of the first point of the quadrant | 0.0 |
| Real error of the first point of the third quadrant | - 6.9 |
| Half sum or difference | - 3.4 |
| Apparent error of the dot under trial | + 12.2 |
| Real error | + 8.8 |

**Example 2.**

For the point 45° of the second quadrant.

| Real error of the first point of the quadrant | + 8.8 |
| Real error of the last point of the quadrant | - 6.9 |
| Half difference | 0.9 |
| Apparent error of the dot under trial | - 8.9 |
| Real error | - 8.8 |

**Example 3.**

Point 88° 6', or last point of the third quadrant.

| Real error of the point 84° 4' of the third quadrant | - 21.0 |
| Real error of the point 25° 8' of the fourth qua-
drant | - 2.9 |
| Half sum | - 11.9 |
| Apparent error of the dot under trial | - 4.0 |
| Real error | 15.9 |

**Example 4.**

Point 88° 6', or last of the fourth quadrant.

| Real error of the point 84° 4' of the fourth qua-
drant | - 21.6 |
| Real error of the point 25° 8' of the first quadrant | - 10.2 |
| Half sum | - 15.9 |
| Apparent error of the dot under trial | + 9.5 |
| Real error | - 6.4 |

It is convenient, in the formation of the table of real
errors, that they should be inserted in the order of the num-
bering of the degrees on their respective quadrants; although
their computation necessarily took place in the order in which
the examination was carried on, or according to the arrange-
ment in the table of apparent errors. The first dot of the
first quadrant having been assumed to be in its true place,
the first of the third quadrant will err by just half the dif-
ference found by the examination; therefore these are alike
in both tables. The real error of the first dot of the second
quadrant comes out in the first example; that of the fourth
was found in like manner, and completes the first line. It
is convenient to put the error of the division 90° of each
quadrant at the bottom of each column, although it is the
same as the point 0° on the following quadrant. The line
of 45° is next filled up; the second example shews this; but
there is no occasion to dwell longer upon this explanation,
for every one, who is at all fit for such pursuits, will think
what has already been said fully sufficient for his purpose.
However, I will just mention that there can be no danger in
the formation of this table, of taking from a wrong line the
real errors which are to be the criterion for finding that of
the one under trial; because they are in the line next to it; the
others which intervene in the full table not being yet in-
ferted. The last course of all is, however, an exception;
for, as the examining microscopes could not be brought near
enough to bisect the angle 2° 48' 45'', recourse was had to
that quantity and its half; on which account the examination
is prosecuted by using errors at two lines distance, as is shewn
in the two last examples.

When the table of real errors is constructed, the other
errors, although it is of no further use, should not be thrown
away; for, if any material mistake has been committed, it
will be discovered as the operation of dividing is carried on;
and in that case the table of apparent errors must be had re-
course to, indeed not a figure should be destroyed until the
work is done. Respecting the angular value of the num-
ers in these tables, it may be worth mentioning, that it is
not of the least importance; 100 of them being comprised
in one revolution of the micrometer screw; and in the in-
finiteness before we 5 6 of them made no more than a fecond,
but it is not pretended that one of these parts was seen beyond a
doubt a degree of an inch, much less the tenths, as exhibited in the tables; but as they were visible
upon the micrometer heads, it was judged best to take them
into the account.

Having now completed the two first sections of my
method of dividing; namely, the first which consists of making
256 small round dots; and the second in finding the errors of
these dots, and forming them into a table; I come now to the
third and last part, which consists in using the erroneous
dots in comparison with the calculated errors, so as ultimately
to make from them the true divisions.

It will here be necessary to complete the description of
the remaining part of the apparatus. And first a little instru-
ment which I denominate a sub-dividing sector presents itself
to notice. From all that has hitherto been said, it must
have been supposed that the roller itself will point out, upon
the limb of the instrument to be divided, spaces corre-
sponding to others previously divided upon itself, as was done
in setting off the 256 points; but, to obviate the difficulty
of dividing the roller with sufficient exactness, recourse
was had to this sector; which also serves the equally im-
portant purpose of reducing the bisectonal points to the
final division of the circle. This sector is represented in
full dimensions by fig. 2; it is formed of thin brasses, and
centered upon the axis at A, in contact with the upper sur-
face of the roller; it is capable of being moved round by
hand; but by its friction upon the axis, and its prefigure upon
the roller, it is sufficiently prevented from being disturbed by
accident. An internal frame B-B, to which the arc C C
is attached, moves freely in the outer one, and by a spring D
is pushed outwards, while the screw E, whose point touches
the frame B, confines the arc to its proper radius. The
arc of this sector is of about four times greater radius than
the roller, and upon it are divided the spaces, which must be
transferred to the instrument, as represented on a magnified
scale by fig. 6. Now the angle of one of the spaces of the
circle will be measured by sixteen times its angular value
upon the sectorial arc, or 22° 30'; but this does not repre-

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**GRADUATION.**
feet any number of equal parts upon the instrument, whose subdivisions are to be 5' each; for \( \frac{1^2}{2^2} \times 5 \) is exactly \( 16\frac{2}{5} \), therefore so many divisions are exactly equal to a mean space between the dots, whose errors have been tabulated. Let therefore the arc of the sector be divided into 16 spaces, of 1° 20' each, and let a similar space at each end be subdivided into eight parts of 50' each, as in fig. 6; we shall then have a scale, which furnishes the means for making the true divisions, and an intermediate examination at every bisectional point.

I have always divided the sector from the engine, because that is the readiest method, and inferior to none in point of accuracy, where the radius is very short; but as it is more liable than any other to centrical error, the adjustment of the arc by the screw E becomes necessary; by that adjustment also any undue run in the action of the roller may be reduced to an infensible quantity.

When the utmost degree of accuracy is required, I give the preference to dividing by lines, because they are made with a less forcible effort than dots are, and also, because if any small defect in the contexture of the metal causes the cutter to deviate, it will, after passing the defective part, proceed again in its proper course, and a partial crookedness in the line will be the only consequence; whereas a dot, under similar circumstances, would be altogether displaced.

But, on the contrary, where accuracy has been out of the question, and only nomenclatures required, I have used dots; and I have done so, because I know that when a dot, and the wire which is to bisection, are in due proportion to each other, the wire covering about two-thirds of the dot, the nicety of comparison possible may be obtained. It may be further observed, that division by lines is complete in itself; whereas that by dots requires lines to dilute the value.

On the upper side of fig. 1, is represented the apparatus for cutting the divisions. It consists of three pieces, J, K, L, jointed together, so as to give to the cutter an easy motion for drawing lines directly radiating from the centre, but inflexible with respect to lateral pressure; d, d, are its handles. The cutting point is hidden below the microscope H; it is of a conical form, and were it used as a dotting point, it would make a puncture of an elliptic shape, whose longer diameter would point towards the centre. This beautiful contrivance, now well known, we owe to the ingenuity of the late Mr. Hindley of York; it was borrowed by Mr. Ramden, (see Engine for Drawing,) and applied with the best effect to his dividing engine.

Previously to cutting the divisions, the parts now described must be adjusted. The cutting apparatus must be placed with the dividing point exactly at the place where the first line is intended to be drawn, and clamped, so that the adjusting screw may be able to run it through a whole interval. The microscope H must be firmly fixed by its two pillars A, B, to the main frame, with its micrometer head at ccr; and with its only wire in the line of the radius, bisecting the first of the 256 dots. And it should be observed that the cutting frame and this must not vary respecting each other, during the time that the divisions are cut; for any motion that took place in either would go undiminished to the account of error. The microscope I is also fastened to the main frame, but it is only required to keep its position unvaried, while the divisions of the sector pass once under its notice, for it must have its wires adjusted afeid to these divisions at every distinct course. The microscope I has two wires, crossing each other at an angle of about 40°, and these are to be placed so as to make equal angles with the divisions of the sector, which are not dots but lines. The sectorial arc must also be adjusted to its proper radius by the screw E, fig. 2, i. e. while the main frame has been carried along the circle through a mean interval drawn by H, the sector must have moved through exactly 16\( \frac{2}{5} \) of its divisions, as indicated by I.

Things being in this position, after having given the parts time to settle, and having also sufficiently proved the permanence of the micrometer H, and the cutting frame, with respect to each other, the first division may be made; then, by means of the screw for flow motion, carry the apparatus forward, until the next line upon the sector comes to the cross wires of I; you then cut another division, and thus proceed until the 16th division is cut = 1° 20': now the apparatus wants to be carried further, to the amount of 3ths of a division, before an interval is complete, but at this last point to division is to be made; we are here only to compare the division on the sector with the corresponding dot upon the instrument; this interval, however, upon the circle will not be exactly measured by the corresponding line of the sector, which has been adjusted to the mean interval, for the situation of the dot 1.4 is too far back, as appears by the table of real errors, by -4.8 divisions of the circle per head. The place of the screw for flow motion must now be restored, the cross wires of H set back to -4.8 divisions, and the sector moved back by hand, not to the division 0 where it began before; for, as it left off in the first interval at 3ths of a division, it has to go forwards 1\( \frac{1}{2} \)th more before it will arrive at the spot where the 17th division of the instrument 1° 25' is to be made, so that in this second course it must begin at 3rd of 0; go through this interval as before, making a division upon the circle at every one of the sixteen great divisions of the sector; and H should now reach the third dot, allowing for a tabular error of -10.2, when the division 5ths of the sector reaches the cross wires of I. It would be tedious to lead the reader through all the variety of the sector, which consists of eight courses; and it may be sufficient to observe, that at the commencement of every course, it must be put back to the same fraction of a division which terminated its former one; and that the wire of the micrometer H must always be set to the tabular error belonging to every dot, when we end one interval and begin another. The eight courses of the sector will have carried us through 3\( \frac{2}{3} \) part of the circle 1° 15', and during this time the roller will have proceeded through half-a-revolution; for its close contact with the limb of the circle does not allow it to return with the sector when the latter is set back at every course. Having in this manner proceeded from one interval to another, through the whole circle, the micrometer at last will be found with its wire at ccr, on the dot from which it set out; and the sector, with its 16th division, coinciding with the wires of its microscope.

\[ 3 \text{Z} \]
## GRADUATION.

Table of Apparent Errors.

<table>
<thead>
<tr>
<th>Name of the Dot</th>
<th>First Quadrant</th>
<th>Second Quadrant</th>
<th>Third Quadrant</th>
<th>Fourth Quadrant</th>
<th>First Quadrant</th>
<th>Second Quadrant</th>
<th>Third Quadrant</th>
<th>Fourth Quadrant</th>
<th>Name of the Dot</th>
</tr>
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<td>0</td>
<td>+ 12.2</td>
<td>- 6.9</td>
<td>+ 17.9</td>
<td>+ 4.6</td>
<td>+ 17.1</td>
<td>- 4.4</td>
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<td>16.7</td>
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We might have quoted several other parts of Mr. Troughton's paper, for the advantage of the reader, but instead thereof, we recommend the perusal of the whole to such persons as are interested in this subject, and shall conclude our account of the present method of dividing by remarking, that it requires not more than one-fourth of the time that Bird's method does, and not much more than one-twelfth that Ramfden's demands, and is applicable to a quadrat or sextant, &c.; that it may be performed by night, by the aid of an appropriate lamp, as well as by day; that the work is, as it were, magnified by the sector; that any erroneous action of the roller, when verified at every interval, does not extend its influence to any distant divisions; that the divisions of the sector very conveniently convert the 256 points into degrees and parts of a degree, while the micrometer head allows for their errors of position; that all tools liable to vary their dimensions by change of temperature are here abandoned; and lastly, that eisfen alone is employed in ascertaining the measures of the arc divided; on which account this method is called dividing by the eye; which appellation, indeed, might have been given to the due de Chaunuel's method; a method which, we understand, Mr. Troughton was not acquainted with till lately, and from which it will be perceived his differs very essentially. We have no hesitation in asserting, that this far excels every other method of graduating large circles that we are acquainted with.

Soon after Mr. Troughton's paper was read at the Royal Society's room, the late Henry Cavendish, esq. F.R.S., whose death is an irreparable loss to the scientific world, contrived a new method of using the beam-compas, with a view of avoiding the difficulties of pointing the exact middle of a small space between two scratches, and of using that point again without altering its critical figure. As these difficulties had led to Mr. Troughton's new contrivances, Mr. Cavendish presumed that a removal of them would render the beam-compas unobjectionable; and that future dividers might continue the use of an instrument which long habit has rendered familiar. The method proposed, but which probably has not been adopted, if tried at all, is, to unite a micrometer that has got a micrometer, with the beam-compas, in such a way, that no dots may be necessary at all in dividing or sub-divisioning any arc of a circle, but that bisection, trisection, and quinquesection, may all be performed by eisfen before the dividing strokes are made on the circle to be divided; we say circle, because this method is not intended to apply to a quadrant, or any other aliquot part of a circle. We will endeavour to explain the method now before us as concisely as possible. Let C, C, C, in fig. 4, of Plate XVIII. of Aeronautical Instruments, be the circle to be divided, in which we will retain the original letters of reference, and B B a frame resting on its plane so readily as to be without flake, but notwithstanding to have the power of sliding smoothly round the circumference to any given point, to which it may be adjusted by a slow motion, and there clamped; let d be a beam-compas, having its cutting point adjustable near b, and let m be a micrometer with two parallel hairs, one fixed, and the other moveable by the micrometer, made so as to slide along the beam of the compas into any required situation. Let a point d on the frame be so chosen, that the line d m may lie in the direction of the chord of half the arc to be bisected, when bisection is used, in which case the whole length from d to m must be very nearly equal to the whole chord of the said arc, and then both the centre of the field of view of m, and also the point d, will fall in the circle to be divided. It is not said how the fixed or central point d is to be supported, and kept perfectly steady, but as its distance from the centre of the circle must necessarily depend on the length of the chord d, it is proposed that the piece of metal that constitutes the support should be adjustable by a sliding motion of some sort, and that the beam near d should rest on a prop to guard the cutting point, when demitwed low enough to make a stroke. Suppose now F and f to be the extreme points of an arc to be bisectioned somewhere near d; after having placed the microscope at or near the middle of the beam, with respect to the two points d and e, and fixed the point on the reeling place of d, slide the frame till the fixed hair in the center, which must be exactly perpendicular to the line d, interferes the circle at F; then, lowering the point d from its prop, make a faint scratch in the next place turn the beam-compas a little raised at the end 2, round its centre d, till f is found over the circle, at the other side at D, where it must rest on a prop for a time; slide now the frame forwards, and adjust till the fixed hair cuts the point f, and there fix it; the second scratch must now be made, which will be over, or short of the first, accordingly as the microscope has been beyond or short of the middle of the distance d. It is not proposed to make a dot between these two strokes, but to bisect the space between the hair, by the eye, or, if necessary, by the moveable hair of the micrometer, after it has measured the whole of this space; the bisection line being now the true place of z, which we suppose brought back to the microscope at m, this intersection is the extreme point of the bisectional arc F z or f z, which must be bisectioned successively in like manner, when the point s has been adjusted. When the arc becomes small, a crooked point is proposed to be used at s, that it may lie in the way of the micrometer, or other, if that plan will not succeed, to adopt what he calls Mr. Troughton's method of bisecting an odd number of contiguous divisions, which was also done, as we have seen, by the due de Chaunuel and others. In cutting the lines of division, the microscope and point d are proposed to be very near together, and, if possible, so near at one side of another, that the stroke cut may coincide with the fixed hair, when the beam has an angular motion given, as a check on the stability of the microscope; and lastly, the point d must be so taken that the line d 2 may now be a tangent to the circle at the cutting point.

If the whole circle could be graduated by continual bisecton, this account is all that would be necessary for explaining the method of dividing here proposed, but, as trisection and quinquesection are necessarily introduced, either before or after bisection, where the computation of chords is rejected, we must give again an account of these processes, which we believe are original. Suppose the arc a s, in fig. 5, to be projected for quinquesection, the equal measures a f, f s, e d, d b, and b u, are laid down in succession, by bringing a to the microscope, and making f nearly one-fifth of the whole, then by bringing up f, the microscope, and marking s, &c. in the same way, beginning at a, the points 2, 4, 1, and 7, are made with the same extent, which it appears was with too small an opening. Now the true point of the first quinquesection from a will be between 2 and 4, and distant from 2 just one-fifth of the differential space 2 b, and the second point will be two-fifths of 4 from 3, and so on for the rest; therefore, in cutting the dividing strokes, the micrometer must measure the whole differential space, and then allow for the due proportion, after which it must be brought into the place of the fixed hair, to bisect the scratch before covered by it, and then the dividing line may be cut: in the same way allowance may be made for 3ths of the small space 3 d, before a second dividing stroke is made; or,
or, which gives less trouble, when the first quinquefecting line is truly laid down, it may be transferred forward by using the fixed hair with it first, and then with the second, while the third is cutting, and so forth till they are all measured and cut in succession from the first measure repeated. This method is, however, acknowledged to be liable to the double error, which may arise, first, from placing the intermediate point, and again, of sub-dividing from it. A third method for quinquefected or trisections is lastly proposed, but is considered inferior to the former plans, and therefore may be passed over in silence.

We must confess there is something specious in the theory of Mr. Cavendish's proposed method of dividing, but our opinion, that it would not answer well in practice, has been confirmed by the assertion of a practical artist, whose judgment in this art we estimate much more highly than our own. Supposing the point $d$ on the frame not to be altered in shape or position by the large sweep of the beam from right to left, and vice versa, alternately, nor yet the point injured, there must necessarily be a change of position in the hands of the operator, as well as in his whole body, at every backward and forward change of the beam, to the right and left, which circumstance will be not only unfavourable to expedition, but also to accuracy; in fact, the operator must be both right-handed and left-handed to succeed with an alternation of operations that require the greatest nicety of management, and in which the hands, the eye, and the diversified attitudes of the body, have all an equal share, and where a false stroke once made cannot be well rectified. The bisected arcs will not be more affected by change of temperature probably than by Bird's method, but the quinquefected arcs may be sensibly affected, as some time must necessarily be taken up in ascertaining the measures by vignon, while the operator breathes on the beam during the inspection of the microscope, and is also handling it in two places during the whole time of obtaining the line points, or rather bars, in question.

Soon after Mr. Cavendish's paper on the manner of dividing astronomical instruments had been read before the members of the Royal Society, the Rev. William Lax, A.M., R.S., Lowndes's professor of astronomy in the University of Cambridge, addressed a paper on the astronomer royal, which was also read and printed in part 2. of the year 1809, immediately after Mr. Cavendish's paper. This paper, as well as Mr. Cavendish's, was probably brought forward in consequence of Troughton's paper, printed in part 1. of the same year.

The method of examination made use of by professor Lax may be familiarly explained thus, without entering into any mathematical formula to mark the value of particular explications, that might puzzle the ordinary reader: two microscopes were adapted by frame-work, so as to be capable of adjustment to any given points of the circle to be examined, and one of them, having a micrometer attached to it, was capable of measuring minute differences between a given arc of 60, 62, or 45, &c. and any of the following multiples of that arc taken in succession; consequently, if all the said differences marked $+\, -$ as the case might be, balanced one another exactly, when the whole circle was gone through, the measure of the first arc was a standard measure, or the exact fraction of the whole that it ought to be; if not, a proportional part of the balance of errors would belong to it, and must be allowed for accordingly. It is not necessary to be more minute in explaining the principle of examination before us, as it is of no use in graduating a circle, but is only intended as a correction on bad graduation, like the French repeating principle, to which it bears some analogy. The author's idea of ascertaining the fractional value of each division in his instrument successively, which he calculates will cost him an expenditure of 98 hours, is founded on an opinion that astronomical instruments in general do not possess that degree of accuracy in their divisions that the makers of them affirm; but he does not appear to be aware that as rigid an examination as his own is practised by all the best instrument-makers in the final adjustment of the divisions, and that too by means of micrometrical microscopes; so that, if a posterior examination is found necessary, it must, generally speaking, be necessary in consequence of some change of figure that the instrument has undergone from carriage, accident, or temperature; in any of which cases the professor's mode of examination will be very desirable. But any one who proposes to take the trouble of making a table of all the positive and negative errors in the divisions of an indifferent instrument, will do well to have the whole of the original paper before him at the time, by which every step in the process will be pointed out as it is wanted. Without meaning to discourage any attempt of this nature, for the proposal of which astronomers are much indebted to the learned professor, we profess a belief that three or four readings of any individual observation by as many microscopes properly arranged round the divided circle, in stationary situations, will answer every purpose of accuracy, and correct all the usual sources of error that exist at the time of making the observation; for when any table of errors is completed with the greatest care, it ought only to apply to observations made while the instrument remains in the same predicament as it was when the table was constructed. Mr. Troughton, who is engaged with the construction of his six-foot circle for the Royal Observatory, intends, we understand, to adopt the use of four microscopical readings, two opposite each other, which will correct for eccentricity simply corrected, and two at 120° distance from one of the former ones, which will check the bisectional dividing, and correct the inaccuracies of division, if any, as well as the effects of any change of figure in the circle by unequal temperature, in the room where it may be used. This proposal, coming from so skilful and experienced an artist as Mr. Troughton, we consider as a strong argument in favour of our opinion, which we expressed in favour of three readings in our article Circles, before the paper in question was published, or known to us.

"I find," says Mr. Lax, "that I can read off, to a certainty, within less than three-fourths of a second, and hence I conclude that I could examine the divisions of my circle (of one foot radius) without being liable to a greater error than 9 63 seconds." This is illud on calculation to be the extreme limit; which, according to the doctrine of chances, can very seldom happen, but if one-half of this error is likely to happen in any one division of the whole circle, as read off by the microscopes, the result will be, that the errors of the table may be as great as those of a well-divided instrument, supposing it to preserve its figure unaltered after examination. In another part of the paper before us, the author says, "we may likewise observe that by this examination we shall not only beolicited against the errors of division, but against those which arise from bowing centres, and from the imperfect figure of the circle, and which in general are of too great a magnitude to be neglected." From this observation we must necessarily conclude, that the distance between the microscope and micrometer, used in measuring, was not the measure of the included arc, but of the angular quantity at the centre opposite that arc; for it must be evident, that, in case the axis of motion is not precisely the centre.
of the divided circle, the arc, simply considered, will not be the true measure of the angle, being one side of the circle will be farther from the centre than the other. For instance, if we suppose the line that passes from zero to the centre of the divided circle, should also pass through the centre of motion, placed a small quantity out of the centre of the graduated circle, in this case the angles subtended by the first and fourth quadrantals will be greater than those subtended by the second and third; but if the line from 90 to the centre of motion should pass through the centre of the divided circle, then the angles subtended by the first and second quadrantals will be greater than those subtended by the third and fourth. When, however, the microscope have a miles hair, as well as a radial one, the length of the radius as well as of the arc may be measured, and consequently the true quantity of the subtended angle.

The great familiarity with the due de la Cour's method of dividing a circle, and of professor Lax's method of examining one when divided, cannot but strike the reader; they both use microscopes, one with a micrometer attached, and both take multiples of the arc under consideration; but one corrects the errors by adjustment during the act of dividing, and the other calculates and tabulates them for subsequent corrections.

Neither will the likenesses pass unnoticed between the apparatus employed by Mr. Lax, and that for the purpose of examining standard measures, described by Sir Geo. Bentinck (Phil. Trans. 1798); but Mr. Troughton, we know, acquires the learned professor of borrowing anything from him.

In the spring of 1810, Mr. James Allan, of Blewitt's Buildings, Peter Lane, London, received the gold medal from the Society of Arts, at the Adelphi, for a new method of equalizing the teeth on the edge of an engine plate for dividing sextants, &c., which would have been described more properly under the article ENGINE, but as it was not then made known, we will take some notice of it in this place, though the Society's account is not yet published. The professed improvement of Mr. Allan's method of packing, consists in its enabling a bad divider of a circle to correct his divisions, by what he calls a self-correcting process. The contrivance is this: the usual wheel or circular plate that is racked, has a brass rim of about two inches breadth, and of the same diameter and thickness as the wheel, rubbed over it, so as to appear a part of the same wheel; four leaden pins, at the exact distance of a quadrant from each other, keep the rim in its place by the aid of several equal-distant screws, and the rim will therefore admit of four positions on the wheel. When the wheel and rim together have been faintly racked in the usual way (see ENGINE by Ransden) one of the other positions is given to the rim, suppose the opposite one, and then the operation of racking by the screw is resumed; when the teeth are a little formed, another position is given to the rim, and the racking resumed as before to a certain extent, and, after several changes have been gone through, it is presumed that the teeth become nearly equalized, and are exactly equal to one another at the conclusion. How far this will be precisely the case we will not pretend to assert. We conceive it to be a very nice operation to drill four holes in the wheel and rim so exactly equidistant and concentric, that a reversed position shall not affect their relative fittings, and if there is the least deviation in this respect, it will be charged as an error on the divisions. The screws also profess to be placed so as to admit of reverting in position, and unless the lead pins fill their holes completely, these pins will, in all probability, be drawn aside by the fixing screws in some of the positions. If the wheel is truly racked in the first instance by a careful divider, and the lead pins placed with precision, the reverting of the rim will not disturb the coincidence of the two rows of teeth all round, which is the thing ultimately desired; but if the original division was bad, and had both negative and positive deviations from true division, in different parts of the circle, then we have a doubt whether the rim will produce the defined effect of equalizing them: a good screw will of itself equalize contiguous teeth, when fifteen teeth or upwards are acted on at the same time; but it will not equalize distant teeth, which the rim professes to do. In order, however, to answer the purpose of a self-corrector, the rim must be competent to meet all cases of bad division that are liable to occur; let us suppose, in the first place, that whenever large teeth are made by the divider on one side of the wheel, teeth corresponding in small ways are to be met with at the opposite side, in this case, which is the most favourable to the operation of the rim, the errors being opposed to each other, by an opposite position of the rim, will correct each other, provided they are of similar quantity, and the rim will produce its defined effect; but, secondly, if equal errors happen to be in the same direction they will not be corrected at all; and, thirdly, if unequal errors be in the same direction, they will be corrected by only half their difference; nay, arcs of the wheel, that are true at first, will, we conceive, be vitiated, unless they fall in with arcs of the rim that are also true. How far a change of temperature will affect this long process we will not affirm; but we hesitate not to give it as our opinion, that an upper plate, or wheel, revolving on the same centre as the wheel itself, would be less liable to central error than the rim with leady pins, however carefully fixed; for leady pins could not then cause any sensible eccentricity in fixing at the different positions.

It would have been desirable if Mr. Allan had given with his account of the racking, his method of making a perfect screw, which is essential in a dividing engine. We lately had an opportunity of examining one of his engine-divided reflecting circles, and found, however, the opposite verniers very well corresponding with each other all round the circumference.

Graduation of a Circle geometrically. After the description we have given in our preceding article of the various practical methods of graduating astronomical instruments, it may, perhaps, seem superfluous to give a further account of the methods that geometerians have proposed for graduating a circle theoretically; but which have been of little or no use in the practical division of circles, or circular arcs, on instruments. It is not sufficient for the purpose of the instrument-maker, that a problem be true merely, but that the means necessary for its adoption in practice be not subject to the introduction of error. The ancient geometry implies the possibility of making a straight line in practice through two given points, which cannot be effected with certainty by a ruler and pointed tool, however carefully applied, while the modern geometry of Mascheroni, the Italian, rejects the use of lines altogether, and substitutes the compasses only in the division of a circle. We will gratify the curiosity of the reader with a few specimens of each method in succession.

In Adam's geometrical and graphical essays are the following problems, which imply the practicability of drawing a straight line through two given points.
GRADUATION.

Problem I.

"To cut off from any given arc of a circle a third, a fifth, a seventh, &c., odd parts, and thence to divide that arc into any number of equal parts."

Example 1.—To divide the arc $AB$ into three equal parts. $A$ being the radius, and $C$ the centre of the arc. Biseect $AB$, fig. 1, of Plate XXI. of Astronomical Instrumants, in $K$, draw the two radii $C K$, $C B$, and the chord $A B$; produce $A B$ at pleasure, and make $B L = A B$; biseect $A C$ at $G$; then a rule on $G$ and $L$ will cut $C L$ in $E$, and $B E$ will be $\frac{1}{3}$, and $C E$ $\frac{2}{3}$ of the radius $C B$; on $C B$ with $C E$, describe the arc $E e d$, lastly, set off the extent $E e$ or $D e$ from $B$ to $a$, and from $a$ to $h$, and the arc $A K B$ will be divided into three equal parts.

Corollary.—Hence, having a sextant, quadrant, &c. accurately divided, $\frac{1}{6}$ the chord of any arch set upon any other arc of $\frac{1}{6}$ that radius will cut off an arch similar to the first, and containing the same number of degrees. Alto, $\frac{1}{6}$, $\frac{1}{4}$th, $\frac{1}{3}$th, &c. of a larger chord will constantly cut similar arcs on a circle whose radius is $\frac{1}{6}$, $\frac{1}{4}$th, $\frac{1}{3}$th, &c. of the radius of the first arc.

Example 2.—Let it be required to divide the arc $A B C$, of the same figure, into five equal parts, or to find $\frac{1}{5}$ of the arc $A B$. Having bisected the given arc $A B$ in $K$, and drawn the three radii $C A$, $C K$, $C B$, with radius $C I$ describe the arc $I m N$, which will be bisected in $n$ by the line $C K$; then take the extent $I n$, or its equal $M a$, and set it off twice from $A$ to $B$; that is, first from $A$ to $a$, and then from $a$ to $o$, and $O B$ will be $\frac{1}{5}$ of the arc $A B$. Again, set off the same extent from $B$ to $m$, and from $m$ to $o$, and the arc $A B C$ will be accurately divided into five equal parts.

Example 3.—To divide the given arc $A B$ into seven equal parts. $A B$ being bisected as before, and the radii $C A$, $C K$, $C B$, drawn, find (by a problem referred to) the seventh part $P B$ of the radius $C B$, and with the radius $C P$ describe the arc $P R N$; then set off the extent of $P R$ twice from $A$ to $3$, and from $3$ to $6$, and $6 B$ will be the seventh part of the given arc $A B$; the compasses being kept to the fame opening $P R$, set it from $B$ to $4$, and from $4$ to $1$; then the extent $A 1$ will biseect $1$ into $2$, and $2$ into $3$; and thus divide the given arc into seven equal parts.

It is obvious, that this method of dividing any portion of a circle, into an odd number of equal parts, is subject to three sources of error in practice; 1st, the variation of the compass from expansion; 2d, the uncertainty of getting the exact points of intersection where the angles are acute; and 3dly, the probable deviation of the points in stepping; to fay nothing of the errors arising from drawing the right lines, which would, in all probability, exceed all the other errors put together, even before they are doubled and trebled, &c. by stepping.

Problem II.

"To divide a given arc of a circle into any number of equal parts by the help of a pair of beam, or other compasses, the distance of whose points shall not be nearer to each other than the given chord," (by Clavius).

Let $A B$, fig. 2, of Plate XXI. be the given circular arc to be divided into a number of equal parts. Produce the arc at pleasure; then take the extent $A B$, and set it off, on the prolonged arc, as many times as the given small arc is to be divided into smaller parts, namely, to the points $C$, $D$, $E$, $F$, and $G$. Divide now the whole line $A C$ into as many equal parts as are required in $A B$, as $G, H, I, K, L, M$, and the same extent, or the same parts, as are required in $A G$; therefore, since $A G$ contains $A F$, and $4t$ of $A B$, $B L$ is 4th side of $A B$. Then, as $G H$ contains $A B$, plus $F H$, which is $4t$ of $A B$, $K L$ will be the $4t$ of $A B$, $D$ $K$, the 4th side of $A B$. Therefore, if we set off the interval $G H$ from $F$ and $H$, we obtain two parts between $F$ and $I$; the fame interval, or extent, set off from these two points near I, gives three parts between $D$ and $K$; when set off from the points from $D$ to $K$, it gives four parts in $C L$; and the next transfer will, from these points, give five parts from $B$ to $A$; so that, by and by, the same extent will give in the remaining divisions in succession from those between $B$ and $C$.

This method is liable to some of the same errors of error as the preceding method, when compasses alone are dependent on; but it is useful, according to the due of Chaulne's mode of proceeding, and may be serviceable in Ramfden's method of dividing, where the points are refiled by opposite microscopes. In all probability the verier scale owes its origin to this problem of Clavius, which problem may be variously diversified, to prevent the necessity of small extents; but whenever small spaces are marked out on an arc by a differential plan of this fort, it is requisite that the extent began with should not alter during the whole process, and also that the points, once marked, should be capable of being referred with certainty at the subsequent transfer. When, however, an error is made in any divided space by a hard particle, or otherwise, this error will recur at every multiple of the extent measured therefrom.

This problem of Clavius, it will be remarked, implies the given arc $A B$ to be measured, or otherwise known previously to the proposed subdivision.

When an entire circle is proposed to be divided into degrees, the radius, which is equal to the chord of $60^\circ$, affords the means of making fix equal arches; and these arcs may be subdivided to arcs of $15^\circ$ each by bisection only; but to reduce the equal arcs to a still lower denomination, recourse must be had to either trisection, quinquesection, computation of the chords, or the differential method originally proposed by Clavius, all which have been already described.

The method of dividing a circle, proposed by L. Mascheroni, is translated into French by A. M. Cauette, 1798, and is contained in the second book of his "Géometrie du Compas." This method rejects not only the drawing of lines, but all measurement from scales, and bisections of an arc by trial, as well as trisections, quinquesections, &c., but admits of stepping, and supposes the extent of a pair of compasses, once taken, to be afterwards invariable. The radius of the circle is the basis of all the other extents, which are very few in number, considering the various divisions that may be made therewith, and three points determined, or without and two within the circle, afford the mensurations of obtaining all the measurements, instead of a scale; consequently, any circle divided by this method must necessarily have its plane extended considerably beyond and within the circular space to be divided, which is seldom the case in a large instrument, where a ring or rim is attached to radial bars, to form a wheel for the body of the instrument, which construction contributes equally to strength and lightness; a
new put from and neceffary within and divided as succeed to the into which thtfo and A 12, take circle 30', or the appren
division ner of this will the kind of this is from the radius, will be kept unaltered, or the chord B F of 90°; all of the arc E F, of E F, and of F B; the circle is now divided into four quadrants at the points B, E, F, and G. To obtain an eighth part of the circumference, let A B, by the compa N° 1, from the point a, out of the circle, to C and H in the arc on each side; then the semi-circle is divided into four, and the points g and a, in the other semi-circle, may be transferred from G to g, and from H to b, with the compa N° 3, or chord of 90°, and the whole circle will now be divided into eight equal arcs by the points B, G, F, H, E, b, f, g.

To gain twelve equal arcs of the circle, with N° 1, or extent equal to radius, from P as the first point turn over to N, and a, in succession one way, and to O and o in succe
cssion the other; and the whole circle will be divided into twelve equal arcs by the points B, N, C, F, D, O, E, a, o, f, e, n. To double this number of equal arcs, begin at G with the same extent of radius, and from L and M one way, and to k and i the other; also from H with the same extent of radius, and from m and l the other way, which points will bisect the former twelve arcs, and make the whole 24.

Hitherto we have had occasion for no other point but a for determining the 24 arcs, and it is some
tewhat remarkable, that the three extents a, e, and f, the radius, the chord of 90°, and the chord of 120°, are to each other in the simple ratio of the square roots of 1, 2, and 3 respectively. In order to sub-divide without trial, the 24 arcs into 48, another point e within the circle is necessary; with a fourth compass take the extent a N, and find the point e by intersection from B and its opposite point E; then N 1, or radius, will cut the circumference from this point e in the points g and h; so shall K e, e N, M 1, and O be each equal to the 48th part of the whole circumference. To divide the circumference into five equal parts, a third point b within the circle, and in the same diameter with c, but at the opposite side of the centre, will be necessary; to avoid confusion from further sub-division, we will take another fig. (4) with similar letters of reference as the preceding one. With N° 3, or extent a A of 90°, intersect at the point b from the points N and O, then with a fifth extent B b set off from B to Q, and the arc B Q will be the fifth part of the circumference. To bisect these five large arcs, take the fifth extent A b and set it from B to P, which will be equal to the arc P Q, and, consequently, will be a tenth part of the circumference. Again, without any further operation, the small arc Q 1, already marked, will be the 120th part of the circumference; and to obtain 6th part of the same, in the quadrant B V F, the extent B F, set off from F to V, will have the arc B V equal to this quantity. And lastly, to procure 240 equal arcs, take the extent c 1, and let it over from a to g, and from g to i, so shall the arc P g be the 48th part of the circumference; but to subdivide all the circumference by the small arc P g of 1° 30', the arc N G of 15 must first be divided into five parts of 3° each, without quinquesection; thus, with the extent A b = B P, step from B to the points P, Q, R, S, and it will fall next in E already marked; then with A b, as before, begin at L and put in the points q and p successively; also from I put in r, and from O put in t, by stepping the points q, s, r, and t; thus shall the points p P r and c sub-divide the arc N G into five equal arcs, and e will be found equal to p, or 1/120th part of the whole. After having obtained these five sub-divisions of 3° and 1° 30', the first may be transferred, with the extent N G for instance, into other arcs of 15 in succession, beginning with G C first, and using the points N, P, G, C, and so on, till the whole is gone through, after which the small arcs thus trans-
ferred may be bisected by an extent c N, going a second time over the fame points in succession as before. Thus will the whole circumference be sub-divided into 240 parts of each 1° 30'..

The eleventh or last problem on this subject, is to divide any arc BC (fig. 4) into two equal parts in G. To do this, with radius A B, which has described the arc BC to be divided, and from the centres B and C, the two exten-
ties of the arc, let the arcs A D and A E be described; let A D and A E be made equal to BC; then from the points D and E, as centres, and with radius D C or E B, find by interjection the point F, lastly, with the radius A F, and from the centres D and E, let the point G be intersected, which will fall in the circumference, if the operation is truly performed, and will also bisect the arc BC as was required.

By the help of the three remarkable points a, e, and b, in our fig. 4, the author of the Geometry of the Compa, has laid down in his twelfth and last book a dozen equa-
tions, some one of which may be applied to determine, by approximation, almost any small arc of a circle that shall cut off a given quantity. It would be tedious to enter here minutely into his various calculations, but, for the sake of amusing the reader, we will select the solutions of a few problems, without the annexed demonstrations, which would enlarge our article too much.

Problem 1.

To find the arc of one degree without the error of half a second.

Solution.—Let the arc B A, below B, be 55° 50', (in the circle which has been divided into 240 parts of each 1° 30'), take the distance b s, and from the point e, as a centre, de-
scribe an arc to cut the circumference in some point Z, and the arc B Z, above B, will be 52° 39' 15", or 52° 39' within about 25"; then in the divisions between B and F is the divi-
division $\frac{3}{4}$, or $\frac{3}{8}$ of the whole circle; there will therefore be $\frac{3}{4} - \frac{3}{8} = \frac{1}{8}$ by approximation within the required degree of accuracy.

Solution 2. Let the arc $AB$ be taken as $10^\circ$ to $30^\circ$, (by the divisions existing) from the centre $a$, and with the distance $b$ as radius, cross the circumference in the said point $Z' = 29^\circ$ to $30^\circ$; or $29^\circ$ to $30^\circ$ without an error of half a second; then look for $28^\circ$ to $30^\circ$ in the existing divisions, viz., $\frac{3}{8}$ of the circle, and the difference will be very nearly as before $= 1^\circ$. This solution is less accurate than the former by about $4''$; the error being $29''$.

**Problem II.**

To find an arc of $15^\circ$ without an error of $1^\circ$.

Solution. Take the arc $BZ$ as $12^\circ$ below $B$, the distance $eB$ will be the chord of $87^\circ$ to $15^\circ$; with a radius of this extent, and from $B$, as a centre, cut the arc $BF$ above, in the point $Z'$, and the arc $BZ'$ will be $87^\circ$ to $15^\circ$; but among the existing divisions of the arc is $87^\circ$, or $\frac{7}{36}$th of the circumference; therefore, the difference of the two arcs is $= 15^\circ$.

**Problem III.**

To find an arc of $10^\circ$ without an error of $10''$.

Solution. Take the arc $BZ$ downward as $49^\circ$ to $30^\circ$, and the distance $eB$ will be the chord of $38^\circ$ to $50^\circ$, without an error of $10''$; then, the division $39^\circ$, or $\frac{3}{8}$, being found already, their difference on the circumference taken from $B$ upwards, will be an arc of $10^\circ$.

**Problem IV.**

To find an arc of $6^\circ$ within $15''$.

Solution. Take the chord of $45^\circ$ from $B$ to $G$ above, and from the point $b$ cut the circumference above $= z$, which will be at $45^\circ$ to $6^\circ$, downwards from $B$, without an error of $15''$, but $40^\circ$ counted downwards already exits, therefore the small arc between is $6^\circ$.

**Problem V.**

To find an arc of $1^\circ$ within $22''$.

Solution. Let $BZ$ downwards be $= 22^\circ$; from the point $e$ as a centre with radius $bZ$, cut the circumference above at $Z$; and the arc $BZ$ will be $29^\circ$ to $39^\circ$, with an excess of $22''$; therefore, the arc $BN$ being $30^\circ$, the arc $ZN$ will be $1^\circ$ within $22''$.

By such means as these an arc of $9^\circ$ within $7''$ is determined; also, an arc of $20^\circ$ within $1''$; an arc of $12^\circ$ within $15''$; an arc of $10^\circ$ within $15''$; and an arc of $5^\circ$ within $2''$; but these last arcs are too minute in all ordinary circles, that we omit the solutions, as being of no utility.

We have hitherto supposed the circle divided into $360^\circ$ with their sub-divisions, but the French have proposed a centesimal division of the circle to be subdivided, where each quadrant has $100$ instead of $90$, making $400$ in the whole circle, with each degree sub-divided by hundreds, &c. This mode of dividing has been exemplified by L. Mafcheroni, in his Geometry of the Compasses; and Mr. Troughton has described the method of graduating a circle in this way by his method, if it should ever prevail in England; but, as there appears to be no advantage to the divisor in affording bisections lower than $25^\circ$, and as our tables of logarithms, as well as astronomical tables, are adapted to the existing mode of dividing the circle, we are unwilling to lead our aid to the introduction of useless innovations, by entering more minutely into the subject.

L. Mafcheroni is the Italian geometrical, we are informed, who taught Bouzaptie some problems, when in one of his campaigns in Italy, with one of which he puzzled the French mathematicians, and gained the reputation of being an adept in mathematics.

**Graduation, in Mineralogy.** When a mineral is discovered which is intermediate between other known species, and in different specimens, or parts of the same specimen, approaches very near to such known minerals, it is said to have the character, from its structure, and the fashion which the earth is more or less compatible in common with some known one, the chert bands in them. More frequently, each stratum is separated by a thin layer or way-board of pulverulent matter, which occasions the strata to part freely; and often, in such cases, the parts of the strata in contact with each way-boards differ nothing from the general mass of each stratum, or there is no graduation between one stratum and the next in succession.

**Graduation of Saline Liquors, in Chemistry.** Is a method of concentrating weak saline solutions, by pouring them through a heap of pebbles and exposing them in this divided rate to a free current of air. See Murals of Soda.

**Gradus Gemonic.** See Gemonic.

**Graecia, Persia, a name used by the old Greek writers for the wrinkled pellicle which arises upon milk in the boiling state. It was also used in a figurative sense for the wrinkles in the skin of old people.

**Grecia, the Greeks, in Ancient Geography.** A country of considerable extent, forming, as it were, the boundary or frontier between Europe and Asia, and comprehending a great number of different states and kingdoms. We have various opinions as to the etymology of the appellations Graeci and Graecia. The most prevalent opinion traces the origin of these terms to Graecus or Graecus, the father, as former, but, according to others, the son of Theffalus, who gave its name to Theffaly. Salamanus supposes the name Graecus to be derived from Ragus or Rau, the son of Pelag, the fourth in descent from Shen, the son of Noah, by the transposition of a letter in order to soften the sound. Pezon deduces it from Graia, signifying in Celtic ancient, and applicable to the Greeks by way of contradiction to more modern people. But it has been objected to this etymology, that the Pelagii and Hellenes were a more ancient people than the Greeks. M. de Gebelin supposes the origin of the appellation to have been the word rhus, or rhe, denoting a sudden or momentary reference to the sea which terminated the Adriatic gulf, on the borders of which the Greeks migrated southwards, whence he forms Rhaeus, signifying this sea, and by prefixing the guttural G to the last root, Graecus. The Greeks were also called Achaeans, Hellenes, and Pelagii. The first of these appellations is supposed to have been derived from Acheus, the son of Xuthus, the son of Hellen, and father of Ion; the second from Hellen, just mentioned, the son of Deucalion, and father of Dorus, from whom sprung the Dorians; and the third, from a pretended founder Pelagus, who, taking possession of the Peloponnesus, occasioned its being denominated Pelagia. Grothus, Salamanus, and Stillingfleet.
names of considerable authority in disquisitions of this nature, suppose that the descendants of Peleg, the fourth in descent from them, the son of Noah, whom they suppose to have been the father of the Scythians, were the first who peopled Greece; and that they only softened the name of Peleg, or Phileg, their progenitor, and called them Pelasgians. But Bochart (in his "Phileg") shows, that both Phileg and Ragau, and their descendants, remained in the confines of Media and Armenia; and that the Scythians were the descendants of Magog, and not of Peleg or Ragau. Some have asserted that the most ancient name of all is that of Ion, which the Greeks themselves derive from Xuthus, grandson of Deucalion. Jofephus affirms (Ant. l. i. c. 7.) that their original is of much older date; and that Javan, the son of Japhet, and grandson of Noah, and his descendants, were the first who peopled these countries; and in proof of this position the learned Bochart has alleged several strong presumptive arguments. He first addsuces the authority of Jofephus, just cited; he then appeals to the name of the patriarch, "Javan," which, without the points, sounds more properly Ion than Javan; he next alleges the authority of Moses, who says (Gen. x. 5.) that "by these" (the sons of Japhet) "were the fifies of the Gentiles divided;" which, according to the genius of the Hebrew, mean, not islands properly so called, but all maritime countries, at any distance from Palæstine, especially those which are along the Mediterranean; and he also refers to the prophets (Is. cap. ult. v. 19. Dan. viii. 21. x. 20) who call Greece by the name "Ion," Ion, or Javan, and hence the Jews have always called the Greek tongue "Ionic," Javanic. To these arguments he adds that the clear remains of Eilitha, Javan's eldest son, are still to be found in that of Elis, one of the ancient kingdoms of the Peloponnesus.

Greece, or Ancient Greece, Geography of. Exclusively of the provinces of Epirus and Macedon, which long remained barbarous and uncultivated, the continental possessions of the Greeks (says Dr. Gillies,) were nearly equal to Scotland in extent. In its length, comprehended between the 36th and 41st degrees of N. latitude, the whole country is almost equally divided by two opposite gulsps, comprising between them a mountainous neck of land, to the breadth of only five miles, into the peninsula of Peloponnesus, and the territory extending northward, from the extremity of the Corinthian isthmus to the southern frontier of Macedonia. The Peloponnesus, 160 miles in length, and scarcely 100 in breadth, is everywhere intersected by mountains, particularly the towering ridges of Zarex and Taygetus. During the flourishing ages of Greece, this small peninsula contained seven independent communities of unequal power and fame, which ranked in the following order: the comparatively large, and highly diversified, territory of Laconia; the fruitful vale of Argos; the extensive coast of Achaia; the narrow but commercial isthmus of Corinth; the central and mountainous region of Arcadia; together with the more level countries of Elis and Meffenia, which are throughout better adapted to tillage, than any other provinces of the Peloponnesus. The Grecian polities beyond the isthmus of Corinth were more comfortable, extending above 200 miles from east to west, and 150 from north to south. They were naturally divided by the long and intricate ridges of Olympus, Pindus, Oeta, and Ossa, into nine separate provinces; which, during the celebrated ages of Grecian freedom, were occupied by nine independent republics. They comprehended the extensive and fertile plains of Thessaly and Bocotia, both of which were, in early times, much exposed to inundations, and the latter, abounding in subterranean caverns, was peculiarly subject to earthquakes; the less fertile, but more secure territory of Attica; the western provinces of Aetolia and Acarnania, encompassed on one side by dangerous seas, and confined on the other by almost impassable mountains; and the four small rocky districts of Phocis, Doris, Locris, and Megara.

These names and divisions (says the above cited historian) which remained to the latest times, are pretty accurately marked by Homer, whose poems continued, through succeeding ages, to be the approved standard and legal code, to which neighbouring communities adhered, in adjudging their disputed boundaries. This qualification, however, must be admitted with two exceptions. During the Trojan war, the extensive province of Thessaly sent forth above a fourth part of the whole Grecian strength, and was divided among many warlike leaders. But when commerce, navigation, and the mechanic arts, enriched and adorned the middle and southern divisions of Greece, the northern district of Thessaly lost its ancient pre-emience. The other exception arose from the extensive power of the house of Pelops, which, had, by fortunate marriages and rich successions, acquired dominion over the northern and eastern parts of the Peloponnesus, formerly containing several independent principalities, and, after the misfortunes of Agamemnon and his family, again divided into the immortal republics of Sparta, Argos, Corinth, and Achaia. The following table will exhibit at one view the principal flates of Greece, with some of their towns and rivers, referring to each article for a further account, and observing that we have admitted into it Macedonia, though it was not properly a province of Greece till after the reign of Philip, or rather that of Alexander, and also Epirus and Illyria.

Table
**Table**

Of the Principal Geographical Divisions of Greece.

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<tr>
<th>Natural Divisions of Greece, or Greece.</th>
<th>Græcia Propria.</th>
<th>Terra Firma.</th>
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<td><strong>Rivers.—</strong></td>
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<td>Inachus, Eranus.</td>
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<td><strong>Towns.—</strong> Argos, Mycenæ, Epidaurum, &amp;c.</td>
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<td><strong>R.</strong> Eurátra.</td>
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<td><strong>T.</strong> Sparta, Amycle, Clythus, Teurium.</td>
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<td><strong>R.</strong> Panisus.</td>
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<td><strong>T.</strong> Messene, Stygelearus, Colonides.</td>
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<td><strong>R.</strong> Alpheus, Anigrus, Selóta.</td>
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<td><strong>Div.</strong> Triphylus, Pihatis, Calo-Elis.</td>
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<td><strong>T.</strong> Olympia, Pifia, Elis.</td>
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<td><strong>R.</strong> Melas, Crathis.</td>
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<td><strong>T.</strong> Sicyon, Phleus.</td>
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<td><strong>T.</strong> Corinthius, Lechaum, Cenchra.</td>
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<td><strong>R.</strong> Alpheus, Erymanthus, Aoranius.</td>
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<td><strong>T.</strong> Megalopolis, Mantinea, Tegae, Orchomenus, Phegala.</td>
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<td><strong>T.</strong> Athene, Eleusis, Marathon, Sunium, prom.</td>
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<td><strong>Megaris.</strong></td>
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<td><strong>R.</strong> Cephiuss, Copais, l.e. Asopus.</td>
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<td><strong>T.</strong> Thebus, Orchomenus, Chirona, Tanagra, Elatea, Thebeta.</td>
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<td><strong>Locri Ozaele, Amphiessa, Naupactus.</strong></td>
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<td><strong>Locri Epicenpiduses . . . Cnemides.</strong></td>
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<td><strong>R.</strong> Achebous, Euenus.</td>
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<td><strong>R.</strong> Argos Amphithecium, Stratus, Aëtium.</td>
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**Islands.**

To the West.

Cycyra, Leucadia, Cephalenia, Dulichium, Zacynthus.

To the South.

Cythara . . . Creta.

To the East.

T essentially.
The ancient authors, who are to be consulted with regard to the different periods of the geography of Greece, are Homer, for the more remote times, in his account of the forces collected for the siege and capture of Troy; Strabo, who avails himself of ample materials to which he had access; Pausanias, who details the results of his own travels and observations; and Ptolemy, who furnishes an useful nomenclature of the cities and chief towns, with their latitudes and longitudes.

Greece, or Ancient Greece, briefly of. The traditions of the Greeks (savs the learned historian, Dr. Gillies,) agree with the authentic records of sacred history in representing the countries afterwards known by the names of Thrace, Macedon, and Greece, as peopled at an earlier period than any other portion of the western world. The southern corner of Europe, comprehended between the 26th and 41st degrees of latitude, bordering upon Epirus and Macedonia towards the north, and on other sides surrounded by the sea, was inhabited, above 18 centuries before the Christian era, by many small tribes of hunters and shepherds, among whom the Pelasgi and the Hellenes were the most numerous and powerful. The barbarous Pelasgi venerated Inachus, as their founder; and, for a similar reason, the more humane Hellenes respected Deucalion. From his son Hellen, they derived their general appellation, which originally denoted a small tribe in Thessaly, and from Dorus, Eolus, and Ion, his three remote descendants, they were differentiated by the names of Dorians, Eoithians, and Ionians. The Dorians took possession of that mountainous district of Greece, afterwards called Doris; the Ionians, whose name was gradually lost in the more illustrious appellation of Athenians, settled in the left barren parts of Attica; and the Eoithians peopled Elis and Arcado, the western and inland regions of the Peloponnesus. Notwithstanding many partial emigrations, these three original divisions of the Hellenes generally entertained an affection for the establishments which had been preferred by the wisdom or caprice of their respective ancestors; a circumstance which remarkably distinguished the Hellenic from the Pelasgic race. While the former discovered a degree of attachment to their native land, seldom found in barbarians, who live by hunting or pastoral life, the latter, disdaining fixed habitations, wandered in large bodies over Greece, or transported themselves into the neighboring islands, and the most considerable portion of them gradually removing to the coasts of Italy and Thrace, those that remained melted away into the Doric and Ionic tribes. At the distance of 12 centuries, obscure traces of the Pelasgi occurred in several Grecian cities; a district of Thessaly always retained their name; and their colonies continued, in the fifth century B.C., to inhabit the southern coast of Italy, and the shores of the Hellespont; and in those widely separated countries, their ancient affinity was recognized in the uniformity of their rude dialect and barbarous manners, extremely dissimilar to the customs and language of their Grecian neighbours. Such is the account of the first settlers in Greece, given by Dr. Gillies on the cited authorities of Herodotus, Dionysius Halicarn., Pausanias, Thucydides, Diodorus Siculus, and Strabo. Modern authors, however, have entertained different opinions on this subject. Some have supposed that the Pelasgi succeeded the Hellenes, and others have considered them as the same people under different denominations. According to M. de Gebelin, Moses, the Jewish legislator, has given us the primitive origin of the Greeks. In tracing the genealogy of the descendants of Noah he says that Japhet, one of the sons of Noah, had seven sons: that the fourth was called Ion, and that he was the father of Eoith, Tharsis or Thracis, Ketim, and Dodanim; this Ion was the father of the Greeks, and M. de Gebelin labours to find among the Greeks four nations formed by his four sons. With this view, he says, that Pelasgia comprehended the whole territory between the Danube and the sea of Peloponnesus; and here we may discover, as he conceives, the respective situation of each of Ion's four sons. Thrace acknowledges Tharsis or Thrasius for its founder; Ketim possessed the country of the Getæ, N. of Macedonia, and Macedonia itself; Dodanim had the country that lay between Macedonia and the Peloponnesus, inhabited by the Dorian; and Elfa designated the inhabitants of the Peloponnesus. This author, in no small degree indulging his imagination, and yet exercising a very considerable degree of ingenuity and attention to facts, observes, that the history of Deucalion is the foundation of the Greek chronology and history; this Deucalion is distinguished by his deluge, his ark, and his being the father of the Greeks or Hellenes. All these circumstances afford a presumption that Deucalion and Noah were the same person. He also says, that the fable of the Argonauts and their voyage to Colchis is a copy of the navigation of Noah. Phryxus, or the "man faved," in the Grecian mythology, is Noah. He discovers also other coincidences, which lead him to conclude, not only that Noah and Deucalion, but that Ion and Hellen, the reputed father of the Greeks, were the same person; and that the Hellenes and Pelasgi were the same people. According to this writer, the Pelasgi were the sole poecloflos of the whole country which extended itself from the banks of the Danube, to the sea of the Peloponnesus; they peopled Thrace, Getæ, Macedonia, Illyria, Epirus, Thessaly, the Phocidea, Attica, and the Peloponnesus; they sent colonies to the ile of Crete, to Etruria, and to the south of Italy; and others crossed the Dardanelles, and were denominated Dacians and Getæ. Greece was in this flat, says M. de Gebelin, when some colonies of strangers arrived on its coasts, as Cecrops at Athens, Danaus at Argos, and Cadmus in Boeotia. Thence, he says, came not from Egypt, but from Phoenicia, a neighbouring country. The first inhabitants of Greece, nevertheless they came, were, in a very considerable degree, like the ancestors of other people, barbarous and savage; and the Hellenes, whose manners were mild and gentle, contributed in some measure to civilize them; but their efforts produced effect very slowly. At length, however, the happy position of their country, forming a kind of frontier between Europe and Asia, and divided only by a narrow sea from Egypt and Syria, and not far remote from those-easter regions which were anciently most populous and flourishing, invited strangers hither to visit, and afterwards to dwell among them. The Greeks were not infensible of their obligations to strangers for the most important discoveries, not only in religion, but in agriculture and the arts; but as they advanced to superiority in arts and arms, above surrounding nations, they vainly fancied that their infancy was reared by the gods; and to the gods they transferred the merit of many useful inventions, that had been communicated to them or their progenitors by their ancient visitants; and it must be acknowledged, that the worship of several divinities was introduced at the same time, and by the same perfons, who made known to them the arts most subfervient to the purposes of human life.

From the middle of the 15th to the middle of the 14th century, B.C. an inundation of Egyptians, Phrygians, and Phrygians overflowed the Hellenic coasts. The principal colonies were conducted by Cecrops and Danaus, Egyptians, who respectively settled in Athens and Argos; Cadmus, a Phoenician, who founded Thebes in Bœotia; and Pe-
Europe. indulged They journey, infomuch, Paleallnie, fancy, fulcli from their well formed Greeks. opinions with three and undertake' the their knowledge in the operations of agriculture; they multiplied the rites of religion; discovered to them several uses of the metals; and, in return, adopted the Greekian language, and generally conformed to the Greek customs and institutions. By the Phoenicians they were taught and encouraged to brave the dangers of the sea, and to maintain a commercial intercourse with each other, as well as with foreign nations. Their country, indeed, was peculiarly advantageous for this purpose; three sides of it being washed by the sea, and being surrounded by numerous islands, and abounding in excellent harbours. Greece, however, was slow in availing itself of the advantages it enjoyed; and in making improvements in commerce, as well as in agriculture, and other useful arts. Many circumstances concurred to retard its improvement. The inhabitants of different parts of the country were unconnected on account of the creeds and rivers, as well as the mountains and promontories, that rendered Greece different from any other part of Europe. The Greekian states were small; each city was at war with its neighbour, and wanted union and mutual concurrence prevented the advancement in science, and the arts. Besides, their coasts were ravaged by pirates, and the metals, instead of being formed into useful implements of agriculture, were converted into instruments of destruction, partly for hostility and partly for self-defence; and the inland country was invaded by Thracians, Amazonians, and other northern savages. But these invasions and ravages of the barbarians occasioned the instituting of the Amphictyonic council, which restored some degree of present tranquillity to Greece, and laid the foundation of its future grandeur. This council produced, after a considerable interval of time, and in the year 1263 B.C. the Argonautic expedition, an undertaking which was attended with a beneficial effect on the manners and character of the Greeks. (See Argonautic.) In the progress of the Greeks towards civilization, they perceived the advantages of political confederacy, before they became sensible of the benefits of civil union; and accordingly a federal association between different communities was formed before the members of any one state had been sufficiently united in the system of domestic policy. In order to cement such disorderly communities by laws and governments, they had recourse to the wise institutions and examples of the Cretans, which are represented not only as the most ancient, but as the best regulations that ever were established in any portion of the Grecian territory. (See Cretes.) Thebæus communicated the Cretan improvements to the Athenians; from Athens they were diffused through Attica, and in process of time through the neighbouring provinces of Greece; inasmuch, that at the commencement of the Trojan war, in 1193 B.C. all the Greekian states had adopted one uniform system of government, uniting the independent spirit of European freedom with the respectful veneration of Egyptian and Atlantic superstition.

Of the mythology and manners of the Greeks in the heroic ages, as well as their geography and history, Homer, whilist he has indulged his fancy, has given us an accurate delineation; and such as was conformable to the system of opinions and belief which prevailed among his countrymen. The religion, or mythology of the Greeks, was adapted to the melioration of their condition, and to the improvement of civil society. Unlike that of the rude inhabitants of ancient Germany, among whom the offices of priest and king were administered by different persons, the foepitre, which denoted the connection of civil power with sacred protection, was conferred, among the Greeks, on those who, while they continued the humble minister of the gods, were appointed to be the chief, but accountable guardians of the people. The same voice (says Dr. Gillies), that smothered the warriors to adventure, and decided, in time of peace, their domestic connections, conducted the order of their religious worship, and presided in the prayers and hymns addressed to the divinity. These prayers and hymns, together with the important rite of sacrifice (which was likewise performed by royal hands), formed the ceremonial part of the Grecian religion. The moral was far more extensively acceptable to the stern god of war; but the virtues of charity and hospitality were still more pleasing to the more amiable divinities. To this purpose Homer says (Od. xiv. 56.) _" all strangers and beggars come from love."_ The submission of subjects to their prince, the duty of a prince to preserve inviolate the rights of his subjects (Il. xvi. 385.), the obedience of children to their parents, the respect for the young for the aged, the sacred laws of truth, justice, honour, and decency, were inculcated and maintained by the awful authority of religion. Even the most ordinary transgressions of private life were congratulated by the pity of the Greeks. They ventured not to undertake a voyage, or a journey, without soliciting the propitious aid of their heavenly protectors. Every meal (and they had three in a day, _v. i. iexa, leiphe, leixo_), was accompanied with a sacrifice and libation. The common form of petitions, the customary duties of civility, were not decided by the varying fates of individuals, but defined by the precise voice of the gods. The laws of religion were guarded and enforced by corresponding sanctions. The dreaded vengeance of imaginary powers was established in the Grecian creed; and it appears from the writings of Homer throughout, that every important event, prosperous or adverse, which happened either to individuals or to nations, appeared to the Greeks, as the reward of their religion and virtue, or the punishment of their irreligion and vice. The principles above stated are confirmed not only by the writings of Homer and Hesiod, but by almost every page of Herodotus, of Pindar, as well as of the Greek tragedies and historians.

The origin of the gods of Greece has afforded a subject of elaborate discussion; and many learned writers have traced it to Palestine, Egypt, and other nations, whence the first settlers or future emigrants sprang. By the dim light of etymology and tradition (lays the ingenious historian of Greece), and the deceitful glare of legend and fable, inquisitive men have endeavoured to trace the corrupt endreams of Pagan worship to the pure fountain of the Jewish dispensation; and it must be acknowledged, that the general doctrine of providence, the rebellion in heaven, the state of innocence, the fall of man, atonement by sacrifice, and a future state of retribution, for which the present life is only preparatory, are tenets, all, or some of which, are found in
the traditions of all nations, Greeks and Barbarians. (See Hefiod, Oper. and Di. v. i. 165. Theog. v. 220. 725.)

But our authority proceeds, that the majesty of Jehovah is very feebly represented by the united power of Homer's divinities; and that the mythology of the Greeks is of such a peculiar texture, that, whenever originally derived, it must have undergone a particular modification in the Grecian soil; nor (he says) is it easy to concur with the opinion of writers who bring it immediately from Egypt, Chaldæa, or Leiffer Afia, when we consider that there is not the smallest vestige in Homer of the judicial astrology which prevailed so much in the two first countries, (Diod. Sic. i. ii. Exod. ch. vi. Psil. i. xxxv.) or of the worshipping of idols, which almost universally prevailed in the last. (Old Testament, paffim.) Dr. Gillies traces the origin of the Grecian faith and worship in the natural passions of the human heart, the hopes, the fears, the wants, the misery of man, which in all ages rendered him a prey to the terrours of superstition.

The great pillar of superstition, raised by the anxious passions of men, was fortified in Greece by a peculiar facility of character, which exerts itself in the exercise of social affection, and strengthens, by a variety of associations, their belief of invisible and intelligent powers. The nature, the character, and the occupations of the gods, were suggested by the lively feelings of an ardent, rather than by the regular invention of a cultivated mind. These celestial beings were subject to the blind passions which govern unhappily mortals: their wants, and their desires, were similar to those of man. But what was wanting in the dignity and perfection, was supplied by the number of the gods. Homer only describes the principal and reigning divinities; but Hefiod, who gives the genealogical history of this fanciful hierarchy, makes the whole number amount to 30,000. Every virtue had its protector, every quality of extensive power in human life had its patron, and every grove, mountain, and river its favourite inhabitants. (See Gons.) The religious creed of the Greeks, composed of materials, in great measure created by fancy, formed by poetry into beauty, and improved into use by policy, became the happiest antidote against the furious renfement, the savage cruelty, and the fierce spirit of wild independence, which usually characterized the ancient and venerable sages of barbarians. The whole system of the Greeks was distinguished above most other false religions, by the uncommon merit of doing much good, without seemingly occasioning any considerable harm to society. The Grecian tenets, while they inculated profound respect to the gods, had no tendency to break the spirit or to repress the courage of their warlike votaries. In order to avert the calamities threatened by the anger of their divinities, they did not recur to the infliction of tortures on themselves, but they repaired the wrongs which they had committed against their fellow-citizens, or compensated, by new attentions, for the neglect shewn to the ceremonies of their national worship. In their estimation, the doing of injury to men, and the omission of prayer to the gods, were the principal causes of the divine displeasure, which they were anxious to avert by a diligent practice of moral duties. The dangerous power of oracles, the abused privileges of asylum, the wild raptures of prophetic enthusiasm, the abominable ceremonies of the Bacchanalia, and the horrid practices of human sacrifice, all which are circumstances that cover with disgrace and infamy the latter periods of Paganism, were unknown to the good influence and purity of the heroic ages; nor is there to be discovered the smallest vestige of any of these wild or wicked inventions, either in the writings of Homer, or of his contemporary Hefiod. Their religious syste

G R E C I A.

In examining the political states of the Greeks, during the heroic age, we shall find that they deserve the title of republics, rather than that of monarchies. The soldiers of any warlike tribe fought and conquered, in their attack of a more fertile territory than their own woods and mountains, not for their leaders, but for themselves; and the land acquired by their united valour was considered as a common property. No disjunction was known among them, but that which was occasioned by the difference of personal merit and abilities. This difference raised a chief or leader to the head of each society; and his superior usefulness in this station, was rewarded by the gratitude of his tribe with a valuable portion of ground, separated from the common property. (II. xii. 310.) This perfec, who commanded in the field, became the arbiter and judge of their civil differences, and he was invested with the honourable office of presiding in their religious ceremonies. The important functions of priest, judge, and general, conferred on the chief and bravest in each particular tribe, were conferred, upon the union of several tribes into one state or nation, on the chief and bravest of all the different leaders. The various states of Greece formed a general confederacy, in which the council of princes regulated the resolutions of the monarch, and the voice of the assembly ruled that of the council; and so likewise in each particular kingdom, the decisions of the senate prevailed over the will of the prince, and the acknowledged majesty of the people controlled the decisions of the senate. The fame distribution of power took place in every particular village.

The civil rights of the Greeks were maintained by the fame simplicity which regulated the political system. As the price of submitting to the restraints of society, a man was secured in the enjoyment of his life and property: his moveables were equally divided, at his death, among his descendants; and the unnatural right of primogeniture, which, in order to enrich the eldest son, reduces the rest of the family to want and misery, was altogether unknown to the equal spirit of the Greek institutions. Causes respecting property were decided by the first magistrate, or by judges of delegated authority. The prosecution of murderers belonged to the relations of the deceased, who might accept a compensation in money for the loss which the family had sustained; but in defect of this composition, all the members of the tribe concurred with the aggrieved, in either punishing the murderer by death, or compelling him to leave the society.

The history of the heroic ages of Greece prefers the most interesting picture of conjugal love, parental affection, and filial duty. The institution of marriage was ascribed to the gods; and it was celebrated with all the pomp of religious festivity. Adultery was held in the greatest detestation, and always mentioned with the same horror as murder. The guilty person might purchase immunity, but more frequently escaped death by voluntary servitude. It has been erroneously said, that, in ancient Greece, wives, as well as concubines, were the slaves of their husbands, and that they were purchased by them. The attention of women was chiefly confined to domestic care and occupations, which did not require any great degree of strength, courage, or wisdom. Weaving and embroidery, which were employments of females, were practised by ladies of the highest rank, and even by queens; and they were also entrusted...
tried with the education of their children. They were permitted to join in the celebration of religious rites and ceremonies, and many of them were consecrated to the service of particular deities.

War, being the principal employment of the Greeks in the heroic ages, they supplied by courage what they wanted in skill. They marched to the field in a deep phalanx, rushed impetuously to the attack, and bravely closed with their enemies. Their principal weapon was the spear; and when the use of this failed, they drew their swords, and rushed impetuously on the foe. The Greeks had also bows, flings, and darts which were chiefly used in their military pacifics. Their defensive armour was complete: a light helmet, adorned with plumes, covered the head and face, a fine coriell defended the breast, groves of brais defended to the feet, and an ample shield, lightly attached to the shoulders, turned in all directions, and opposed its firm resistance to every hostile assault. Their close combat battles served to excite the most furious passions, and to embitter national animosity by personal hatred and revenge. Before any war could be undertaken, it was necessary to dispatch ambassadors, who explained the injury that had been done, demanded satisfaction, and if this were refused, denounced the resolution of their community to prosecute its claim by force of arms. After the commencement of war, the characters of heralds were equally respected by friends and foes; and they travelled in safety through the midst of embattled hosts. The use of poisoned weapons was forbidden, under pain of the divine displeasure. The will of the gods required that life should be spared, when a sufficient ransom was promised; and when a treaty of peace was concluded, without any ratification but the honour of the contracting parties, the peridious wretches who betrayed the faulty of their engagements were devoted, amidst libations and sacrifices, to the fury of the terrible goddesses.

(II. 1.)

From the practice of war we may now turn our attention to the arts of peace. Pallagage and agriculture supplied the Greeks with food and clothing; but their implements for preparing these articles were very imperfect. The principal produce of their fields was barley, which supplied the ordinary food of men as well as horses. Mills were the steam, and the grain was bruised between two large stones with the hand. They cultivated the olive, but knew not how to extract the oil; and though their soil was favourable to the grape, the juice was obtained by a tedious and operose process, which rendered wine scarce and dear. Of the mechanic arts, weaving was but little understood; and the hatchet, wimble, plane, and level, are the tools mentioned by Homer, who seems to have been unacquainted with the saw, the square, and the compasses. Homer does not mention the orders of architecture; and pillars are the only ornaments adjoined to the edifices which he describes. The roofs of the houses, consisting of two floors, and surrounded by a wall, were flat. The invention of enamelled metals had been cultivated with peculiar felicities; and though painting, properly so called, was rude and unformed during the age of Homer, the genius of the divine poet has described the rudiments of his kindred art with such grace as would adorn its most refined state of perfection. Music was much practiced among the early Greeks. (See Music of the Greeks.) The sciences were in a low and imperfect state. For arithmetic they had little occasion; by means of their astronomy they were enabled to observe the eccentricals which directed the adventurous course of the mariner; but their navigation was so imperfect, that they seldom abandoned the coasts. The only stars mentioned by Homer are the Great and Little Bear, the Pleiades, the Hyades, Orion, and the Dog-star. Of their games, we give an account under Games and Gymnastics. As to their general character, we shall transfer the two or three paragraphs from the first volume of Dr. Gillies's History of Ancient Greece, to which we have been indebted in the compilation of this article. "The Greeks, says Dr. G., had advanced beyond that uniform idleness of deportment, that fallen ferocity of manners, and that hardened insensibility of heart, which universally characterizes the savage state. They still policed, however, that patient intrepidity, that noble spirit of independence, that ardent attachment to their friends, and that generous contempt of pain, danger, and death, which render the description of the wild tribes of America so interesting to a philosophic mind. Of two principal en-joyments of life, study and conversation, they were little acquainted, indeed, with the confolations and pleasures of the first, the want of which was compensated by the finery, the confidence, the charms of the second. Their social affections were left comprehensive in their objects, but more powerful in their effects than those of polished nations. A generous chief rushes to certain death to revenge the cause of his friend; yet refuses to the prayers of an aged parent the melancholy consolation of interring the remains of his favourite son, till the corresponding image of his own father arise in his mind, and at once melts him to pity. (Iliad, xxiv.) The imaginary wanton and artificial passions which are so necessary to urge the hand of industry, and to vary the pursuits of men, in improved commercial societies, were supplied to the Greeks by that excessive sensibility, which interested them so deeply in the affairs of their community, their tribe, their family, and their friends, and which connected them by the feelings of gratitude even with the immate objects of nature. As they were not acquainted with the fame diversity of employments, so neither were they fatigued with the same giddy round of dissipat pleasures which augment the splendid misery of later times. Though ignorant of innumerable acts which adorn the present age, they had discovered one of ineffable value, to render the great duties of life the most entertaining amusements. It will not, perhaps, be easy to point out a nation which united a more complete subordination to established authority with a higher degree of personal independence, and a more respectful regard to the dictates of religion with a more ardent spirit of martial enterprise. The generous quality of their principal establishments, and their fancied intercourse with the gods, conspired to raise them to a certain elevation of character which will be for ever remembered and admired. This character was rendered permanent in Sparta, by the famous laws commonly ascribed to the invention of Lycurgus, but which will appear (under that article) to have been "almost exact copies of the customs and institutions that universally prevailed in Greece during the heroic ages." The character of the Greeks in subsequent periods will appear in the account of the several states, provinces, or kingdoms, which they occupied.

The general history of Greece may be divided into four periods, marked by as many memorable epochs. The first extends to the siege of Troy in the year 1 184 B.C.; the era of its commencing is not precisely ascertained; but if we date it with the foundation of the kingdom of Sicily by Anaximander in the year 2670 B.C., it lasted 905 years. This was properly the infancy of Greece; and comprehended the establishment of the kingdoms of Sicily, of Argos, 1376 B.C., of Athens, 1556 B.C. of Troy, 1546 B.C. of Thebes, 1493 B.C., of Mycenae, 1444 B.C.; the deluge of Ogyges, 1764 B.C. and that of Deucalion, 1503 B.C. \[4B\]
the murder committed by the daughters of Danaus on their husbands, 1485 B.C.; the introduction of the Phoenician letters into Greece, 1493 B.C.; the legislation of Minos in Crete, 1426 B.C.; the Argonautic expedition, 1265 B.C.; the exploits of Theseus, 1234 B.C.; the war of the seven heroes against Theseus, 1225 B.C., &c. &c.

The second period begins with the siege of Troy, and terminates with the battle of Marathon, 490 B.C., including about 694 years. In the year 1104 B.C., 86 years after the taking of Troy, the Heracleida, or descendants of Hercules, conducted the Dorians to the eastern coast of Peloponnesus, and having landed their followers without opposition, subdued the dodecarchies, territories, to which they had long laid claim, comprehending the whole Peninsula, except the central province of Arcadia, and the maritime district of Achaia. The five other provinces were conquered at the same time, though by different means. Laconia was betrayed to the invaders; Argos acknowledged their authority; Corinth, Elis, and Messenia submitted to their arms. The revolution was complete, and effected with little bloodshed; but not without great oppression of the ancient inhabitants, many of whom emigrated, and many were reduced to slavery. The Heracleida divided their new acquisitions by lot. Upon the division of Peloponnesus the kingdom of Laconia commenced, 1102 B.C. In the year 1056 B.C., or 88 years after the taking of Troy, the Eolians, having traversed the northern parts of Greece in quest of new settlements, crossed the Hellespont, and established themselves along the shore of the ancient kingdom of Priam. They gradually diffused their colonies from Cyzicus on the Propontis to the mouth of the river Hermus; which delightful country, together with the isle of Lesbos, from this time received the name of Eolis or Eolia, denoting that its inhabitants belonged to the Eolian branch of the Hellenic race. In the year 1070 B.C. royalty terminated in Athens upon the death of Codrus, and the Athenians were afterwards governed by Archons. In the year 1044 B.C., 63 years after the return of the Heracleida, the Ionians, blended with other emigrants, having seized the central and most beautiful part of the Aeolic coast, gradually diffused their colonies from the banks of the Hermus to the promontory of Paphion, and afterwards took possession of Chios and Samos; and all these countries were united in the year above-mentioned by the name of Ionia, intimating that the Ionians composed the most numerous division of the colony. (See Ionia.) The Doric migration took place in the year B.C. 944 (See Dorians.)

During the heroic ages we have seen, in the preceding part of this article, that the authority of kings was founded on religion, supported by gratitude, and confirmed by utility. While they approved themselves worthy ministers of heaven, they were entitled to due and hereditary honours; but they were bound to respect the rights, the sentiments, and even the prejudices of their subjects. But at length, inced by ambition and avarice, they transgressed the prescribed limits, and trampled on those laws which their predecessors had held sacred. The minute division of property, which had taken place, not only in Peloponnesus, but in the northern provinces of Greece, rendered the nobles and people more liable to their approaches, and induced them to repeat their oppression. The more independent and illustrious citizens, who from the earliest times had been accustomed to come armed to the council or assembly, communicated their grievances, and adopted proper means for removing them. Miltiades, the fourth Argive prince in succession to Temenus, to whom Argos fell on the Heraclidaan distribution, was condemned to death for usurping absolute power. In Attica monarchy more honourably expired; it perished with more disgracefully in Arcadia; but was gradually abolished in every province of Greece, except Sparta, from the southern extremity of Peloponnesus to the northern frontier of Thessaly. The consequence of the abolition of monarchy was the introduction of accumulated evils. These, however, were removed, or at least alleviated, by the authority of the Amphictyonic council, and by that of the oracles, particularly that of Delphi. This latter oracle confirmed by its awful function the Olympic games and Spartan laws, which had been respectively established, the former by Iphitus, and the latter by Lycurgus in the same year, viz. 884 B.C.; and which served to the safety of their respective territories, though in different ways; the Olympic games by rendering Elia the most pacific, and the laws of Lycurgus by making Sparta the most warlike, of all the Grecian communities. Greece, even under its kings, was divided into many independent states; and under the republican form of government it was still more subdivided; and hence wars became more frequent, and battles more bloody and more obdurate. But the long and spirited contest between the Lacedaemonians and Meffennians was the only war of that age which produced permanent effects. Of Laconia and Meffenia we shall give an account under their respective articles. We shall here observe, that they were both governed by kings of the family of Hercules, and inhabited by subjects of the Doric race, and yet this kind of mutual affinity and connection was not sufficient to counteract other causes, which produced hostilities among them. Urged by reciprocal provocations which we cannot here detail, the Spartans invade the Meffennian frontier and attack the small town of Amycla; and thus in the year 743 B.C. began the first war between the Meffennians and Lacedaemonians, which lasted 19 years, and terminated with the surrender of Ithome, their capital, to the Lacedaemonians, and the dispersion of its inhabitants. In the year 685 B.C. the Meffennians prepare to revolt, and a second war commences, which continued 14 years, and ended with the capture of Itra, or Eira, by the Lacedaemonians, after a siege of 11 years. The conquest of Meffenia rendered Sparta the most considerable power in Greece, as its subjects occupied two-fifths of the Peloponnesus. In the year B.C. 600 commenced the first "Sacred War," occasioned by an injury committed against the oracle of Delphi, and undertaken by order of the Amphictyons, and terminated by the total destruction of the cities accused of sacrilegIOUS outrage. On occasion of the happy termination of this war the Pythian games were re-established 591 B.C. The battle of Marathon, which closes this second period of the Grecian history, terminated, after a very severe contest, in the total defeat of the Persians, and triumph of the Athenians under their commander Miltiades.

The third period of the history of Greece comprehends an interval of 167 years, that elapsed between the battle of Marathon and the death of Alexander, 323 B.C. The Athenians, in compliance with the advice of Themistocles, augment their navy; and under his command they defeat the fleets of Xerxes and Corecyra. Themistocles, instead of allowing the Athenians to indulge themselves in security after the advantages they had gained, exhorted them to be always ready for action. In consequence of this judicious counsel, they were enabled to oppose the immense armaments of Xerxes. The Athenian fleet proved the safe-guard of Greece, and prevented a country, from which the knowledge of laws, learning, and civility was diffused over Europe, from becoming a province of the Persian empire, and being confounded with the masts of barbarous nations. Xerxes was provided
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provided with 1200 ships of war, and 3000 ships of bur- 
than, for his intended expedition: and his army consisted of 
eventeen hundred thousand infantry, and four hundred thou-
sand cavalry, and these, joined to those who manned his 
flattened, to near two millions of fighting men. In the year 480 B.C. he passed the 
Hellepont, and the wondrous monarch had the pleasure of reviewing the whole 
flotilla and army near Doricus, a city of Thrace, at the 
mouth of the river Hebrus. In the mean while those Greci- 
ans, who, unmoved by the terrors of invasion, obeyed the 
voice of liberty and their country, had sent deputies to the 
ithmus of Corinth, to deliberate about the common safety. 
A general union prevailed, and the general danger seemed to 
harmonize the most discordant members of the common 
council. The Grecian fleet failed to Artemision, patient- 
ly expecting the arrival of the barbarians. The fleets of 
Thermopylae, 15 miles distant from the flotilla of the Greci- 
ian fleet at Artemision, and deemed the gate or entrance into Greece, was guarded by troops, consisting chiefly of 
Persepolitanians, under the command of Leonidas, the 
Spartan king. Xerxes having made his previous arrange- 
ments, sent messengers to treat with the Spartans, and to de- 
ter them to lay down their arms; to which they replied, 
"Let him come and take them." The messengers then of-
tered them lands, on condition of their becoming allies to the 
great king, but they answered: "That it was the custom of 
their republic, to conquer lands by valour, not to acquire 
them by treachery." Xerxes waited four days after the 
return of the messengers, expecting the Grecians to retreat 
into their own country, or surrender their arms. On the 
fifth day he determined to chastise their insolent opposition. 
The attack was ordered, and the Persians were repelled: it 
was renewed the next day with the like result. 

The Greeks, however, were betrayed by Epialtes, a per- 
fidious wretch of their own nation, who conducted a body of 
twenty thousand Persians through a passage in the moun-
tains of Ossa, several miles to the west of that guarded by 
Leonidas. The Athenian general had prudently guarded this 
important but unknown path, which, as he conceived, chance 
or treachery might discover to the Persians. A body of 
1000 Phocians had been appointed to this service; upon 
the approach of the Persians they instantaneously flew to their arms, 
and determined to resist the progres of the enemy or to die 
in the attempt. Expecting to be pursued, they retired to the 
heighted part of the mountain; but the Persians, declining to 
follow them, feized the passage which they had aban-
doned, and marched down the mountain in order to accom-
plish the design which had been preconcerted by the traitor 
Epialtes. Leonidas, apprized of this act of treachery, called 
a council of war; when all the confederates of Persepolis, 
except the Spartans, determined to abandon a post which they 
deemed to be untenable. Leonidas, however, with 700 
Thebians, 400 Thiscans, and 300 Spartans, remained in the 
poll of danger and of glory. In the dawn of night, the 
Spartans, headed by Leonidas, marched in close battalion 
towards the Persian camp, with resentment heightened by 
depair. The conflict was ardent and destructive, whilst the 
Greeks were favoured in their attack by the darkness of the 
night; but at the approach of day the Persians, who had 
previously fled, discovered that their fears had multiplied the 
number of the enemy; and therefore rallying their scattered 
forces, Xerxes gave orders to pursue the Greeks, who had 
retreated in close order to the fronds of Thermopylae. 
The shock was dreadful; and the battle was maintained on the 
tide of the Greeks with persevering intrepidity and def-
perate valour. At length a barbarian dart pierced the heart 
of Leonidas; nevertheless the Laccestrians and Thebians, 
though ingloriously defeated by the Thebans, maintained 
their firmness to the last; and they were finally not defrayed 
or conquered, but buried under a trophy of Persian arms. 
(See LEONIDAS and THERMOPYLAE.) During the military 
operations at Thermopylae, the Grecian fleet was stationed 
in the harbour of Artemision, the northern promontory of 
Euboea, and the numerous one of the Persians had an-
chored on the road that extends between the city of Caifanza 
and the promontory of Sepias, on the coast of Thebaly. 
Here it suffered calamities, of which Xerxes had been fore-
warned, but which he disregarded. Themistocles, by his 
address, prevailed on the Athenian commander to remain at 
Artemision; and as soon as the Persians recovered from the 
terrors of the storm, the effects of which they had suffered, 
both sides prepared for a battle, for the refult of which see 
ARTENIUM, The Persians were again totally defeated near 
Salamis (which fee); upon which Xerxes determined to 
leave Greece. Of the conduct of Themistocles on this 
occasion, see his article; and for an account of the battle of 
Plataea, see PLATAEA. The event of this bloody engage-
ment not only delivered the Grecians from the danger of fer-
ducy, but gave them possession of greater wealth than they 
could ever have expected to posses. In his precipitate re-
trart from Greece, Xerxes left behind him all his riches 
and magnificence. The battle of Plataea was succeeded by that of 
Myical, in which the Greeks were again victorious. 
About 40,000 Persians perished in the field, many fell in the 
pursuit, and the remainder fled in disorder, nor thought them-
elves secure till they had reached the walls of Sardis. 
Their ships, their camp, the freedom of Ionía, and the undisturbed 
possession of the Asiatic coast, formed the inestimable prize 
of the victors; and thus the expedition of Xerxes, under-
taken with a view to enslave Europe, restored liberty to the 
fairest portion of Asia. The beginning of the 5th century 
B.C. forms the most glorious era in the history of Greece. 
It is, however, the peculiar glory of the Athenians that, 
during their rapid career of military and naval triumphs, 
they cultivated, with a generous enthusiasm, the arts which 
adorn peace as well as war. It is observable that in the sin-
gle life-time of Pericles, the republic of Athens produced 
those inestimable models of poetry, eloquence, and philo-
 sophy, which, in every succeeding age, the enlightened por-
tion of mankind hath invariably regarded as the lofti-
standards, not merely of composition and style, but of 
taste and reason. The name of Greek seemed thenceforth 
to be funk in that of Athenian. (See ATHENS, and 
SPARTA.) For an abstract of the further history of this 
period of Alexander's history and exploits, we have given a 
brief sketch under his article; we shall here observe, with 
Dr. Gillies, that during the latter years of his reign the 
Greeks, deprived of the honour and delivered also from the 
cares of independent sovereignty, and undisturbed by those 
continual and often bloody dilisions, which deformed the 
nation under their turbulent condition, indulged their natural 
propensity to the social embellishments of life; a propensity 
by which they were honourably distinguished above all other 
nations of antiquity. Their innumerable shows, festivals, 
and dramatic entertainments, were exhibited with more pomp 
than at any former period. The schools of philosophers and 
rhetoricians were frequented by all descriptions of men. 
Painting and statuary were cultivated with equal ardour and 
succes. Many improvements were made in the sciences, and 
the Greeks, particularly the Athenians, still rivalled the 
taste and genius, though not the spirit and virtue, of their 
ancestors. Yet even in this degenerate state, when patriotic 
and true valour were extinct, and those vanquished republi-
cans had neither liberties to love, nor country to defend, their 
martial
martial honours were revived, and brightened by an associa-
tion with the renown of their conqueror. Under Alexander, their
exploits, though directed to very different purposes, equaled, per-
haps excelled, the bejewelled trophies of Marath-
on and Plata. 1 By a singularity peculiar to their fortune, the
era of their political disgrace coincides with the most
splendid period of their military glory. Alexander was him-
self a Greek; his kingdom had been founded by a Grecian
colony; and to revenge the wrongs of his nation, he under-
took and accomplished the most extraordinary enterpris-
res recorded in the history of the world.

The fourth period of the history of Greece, commencing
with the death of Alexander, 323 B.C. and terminating
146 B.C. when the Achaean league was dissolved, and
Greece became a Roman province, under the name of
Achaia, comprehends an interval of 177 years. After various
changes and revolutions, for an account of which, see
ACHAEANS AND ATTI.

Greece, Magna, a name given to the southern part of
Italy, comprehending Apulia, Lucania, and the country of
the Buri, and also to Sicily and several of the adjacent
islands. The name of Greece was derived from the Greek
colonies, which migrated hither at different periods, and the
epitaph Magna, or great, was derived from mere osten-
sation, as Pliny informs us (I. iii. c. 1.). This migration and settle-
ment took place at a very early period, about 1055 years
B.C. The most numerous colonies, the migration of which
was occasioned by intestine faction, foreign invasion, or the
reflex of spirit of adventure and rapine, occupied the isles of
the Ionian and Egean seas, the southern coast of Italy almost
interfected by the former, and the wooring shores of Asia
Minor so beautifully diversified by the latter. The larger
islands of Sicily, Sardinia, and Cyprus were very anciently
planted by Greeks.

Whoevers has observed the defective barbarity of Calabria,
or reflected on the narrow extent and present weaknesses of
Sicily, will scarcely believe, that five centuries B. C. those
countries contained above 20 warlike communities, several
of whom could feed into the field 100 thousand fighting
men. In order to account for this wonderful population,
we must look back to the period above mentioned in the
heroic ages; and consider likewise that the greater number
of Greek colonies in those parts were planted during the
eighth century before the Christian era, and chiefly, 1. By the
Euboeans, whose principal city Chalcis, usually furnishing
the conductor of the colony, gave the epithet of Chal-
cidian to the new settlements; 2. By the Achaeans of Pel-
opomeii, who were of the Eolian tongue and images; and 3.
By the Dorian states of that peninsula, especially Corinth.
Besides these powerful colonies in Corcyra, Locres, Amat-
torium, Ambracia, whose transactions form such an im-
portant part of the history of ancient Greece, the Corin-
thians founded Syracuse, which soon became, and long
continued, the capital of Sicily; and in the sixth century
B. C. the Syracusians had extended their settlements over
all the southern coast of the island. By means of these and
similar establishments of a powerful kind, the Dorians ac-
quired, and always maintained, an ascendant in Sicily; but
the Achaean colonies, who were of the Eolian blood and
language, commanded the Italian shore. Crotona, the most
considerable city of the Achaeans, and of all Italy in ancient
times, was built 710 years B. C. Sybaris, its rival, was
founded about the same time. The former sent colonies to
Tirins, Cephalaoria, and Pandória; the latter built Lapis,
Metapontum, and Polidonia, or Paedum, whose admired
ruins attest the ancient wealth and grandeur of the Greek
cities of Italy. We may here remark, that the Ionians,
who came from Euboea, and settled chiefly near the eastern
shore of Sicily, never rivaled the power and fame of their
Dorian and Achaean neighbours, but fell short of those
notions in Magna Graecia, as much as they surpassed them
in the shores and islands of Asia. In order to account for
the flourishing situation of Magna Graecia about the year
500 B. C., many causes may be assigned, besides those of
a physical and moral nature, which usually contribute to the
rapid growth of newly-established colonies. We might
mention the natural fertility of Magna Graecia, and partic-
ularly of Sicily, which in many places produced an hundred
fold; and in this connection observe, that the Greeks who
failed thither from Peloponnesus, carried with them the
knowledge and practice of agriculture, which had early
attained a high degree of perfection in their peninsula; and
that the exuberant soil of Sicily, improved by cultivation,
soon exhibited a picture of that rich abundance, which, in
later times, made that beautiful island be entitled the gra-
mary of Rome. Besides, the peculiar situation of the
Achaeans and Dorians, from whom chiefly the colonies in
Magna Graecia derived their origin, had a considerable in-
fluence in accelerating the population and grandeur of their
new establishments. The impartial and generous spirit of
the Achaean laws early compensated the natural defects of
their territory, which was a long, but narrow, strip of
ground, not more fertile than extensive, along the Corinthian
gulf. They, however, were the first, and long the only
republic of Greece, who admitted strangers into their com-
unity on equal terms with the ancient citizens. The
equitable and generous policy, which they transported with
them into Magna Graecia, could not fail to promote the
happiness and prosperity of that delightful country.
The condition of the Dorians, at the time when they planted
colonies in Italy and Sicily, is not less worthy of considera-
tion. The Dorian states of Peloponnesus were then uni-
versally subject to the gentle government of limited but
hereditary princes, or to magistrates chosen from the
defendants of their ancient royal families; and who, thus
adorned by birth, were sometimes still more ennobled by
wifenomt and virtue. Moreover, the colonies in Magna
Graecia, enjoying a wide extent of territory before them,
were not retarded in their advancement by intercourse of
interest on the part of neighbouring states, but they found
sufficient employment in subduing the original inhabitants
of that country, without commencing hostilities either
against their neighbours or against each other. The kings
or nobility of Magna Graecia, secure of their own pre-em-
nence, felt nothing of the republican jealousies which
prevailed in the mother country. They received with pleasure
new citizens, or rather subjects, from whatsoever quarter they
might come. The states of Italy and Sicily, thus increasing
by degrees, could soon boast, the former of Crotona, Ta-
rentum, Sybaris, Rhegium; the latter of Syracusae, Agrig-
etum, Messena, Himera, and several other cities, which
rivalled or surpassed the wealth of Athens or Corinth, and
the populous cities of Thesee, Argos, or Sparta. The wars,
conquests, or oppressions, and, above all, the civil dissections,
in which the fifth century B.C. disturbed and deformed the
coast of Ionia, and the other Grecian colonies in the islands
and continent of Asia, brought frequent excursions of inhab-

tants to the shores of Magna Graecia. Nevertheless, the
Ionians, along with their poetry, music, and painting,
communicated also their diffusive and artificial appetites to the
Greeks of Italy and Sicily. It is a fact, however, that
Magna Graecia, having obtained opulence by industry,
dilapidated it in idleness and licentiousness: inform us that the
Greek cities of Italy, and particularly Sybaris and Crotona,
cava, for a prey to the most dangerous errors and vices, when Pythagoras came to their relief about 550 years before the Christian era. His philosophy and legislation reformed and improved the manners and policy of Magna Graecia, and contributed, in an eminent degree, not only to the quiet and happiness, but to the industry, power, and splendour of that celebrated country. (See Pythagoras.) The concurrence of historians affirms us, that the school of Pythagoras flourished about 40 years to the unprofitable benefit of Magna Graecia, when a war arose between Crotona and Syracuse, the latter of which had over contemptuously rejected the Pythagorean institutions.

Having traced the progress towards prosperity and renown of Magna Graecia, it is natural to relate the causes of its decay. In Italy, the citizens of Crotona had too soon reason for lamenting their ill-luck against their magnates, and the dereliction of the discipline of Pythagoras. The other Greek cities of Italy, which are said to have imitated the fatal example of Crotona, were harassed by wars against each other, or against their barbarous neighbours. In 60 years after the death of Pythagoras, an attempt was made to revive his institutions; but in less than 40 years a new persecution entirely drove the Pythagoreans from Italy, and completed, according to Polybius (i. 423.) the confusion and misery of that once happy country. Gilles's Hist. of Greece, vol. ii.

GRAFF, from the French graveur, i.e. sculter, a skulter, or painter. It is used in the flat. 5 Hen. VIII. cap. 1.

GRAFFIGNY, FRANCOIS D'ISSEMBROUG D'APPON-OURT DE, in Biography, a literary lady, daughter of a major of the gendarmerie of the duke of Lorraine, was born at Nancy about the year 1624. She married de Graffigny, chamberlain to the duke, a man of violent passions and most brutal disposition, from whom she obtained, after living with him many years, a legal separation. She now went to Paris with mademoiselle de Guiche, who was espoused to marquis Richelieu, and soon made her merit known to the worth of the capital. In 1745 she was announced as the author of a Spanish novel. This was followed by the "Lettres d'Une Peruvienne," in two vols. 12mo., which were much read and admired, though defective in point of style, and in the metaphorical manner of treating of the passion of love. One of her best pieces was entitled "Conic," a drama in five acts, which was written in prose. She wrote another, which was entitled "La Fille d'Aritside," and which obtained a much less share of public approbation. This lady was of a truly estimable character in private life, and had many respectable friends, even in the highest ranks of society. The emperor and empress honoured her with particular notice, and made her frequent presents. She was an associate of the academy of Florence; and died at Paris in 1758, at the age of sixty-four. Gen. Biog.

GRAFFIO, or GRAVIO, in our Old Writts, denotes a landgrave or earl. "Nec princeps nec grafio, hanc alienationem promoverat." Graft, in Gardening, a name applied to the shoot or scion that is to be inserted into the stock or branch of the tree, in the operation of grafting. It has occasionally the vulgar term of graft given it by gardeners. The word is formed of the French graffe, which signifies the same thing; and greffe, in this sense, is supposed to have been derived from the resemblance the shoot bears to the point of a penknife, which was anciently called greffe. Du Cange goes farther, and derives the ancient greffe from græ/fo/ium: Menage, from graphem, a Latin word, signifying a little fleye, or iron boeldin, one end whereof was pointed, and forced to write on waxen tablets; and the other flat, serving to efface or rub out what was written.

There are several circumstances to be attended to in choosing the graft. The shoots or scions that are to be employed in this way, should be selected and cut in the manner that will be directed in speaking of grafting; but they should never be taken from such as have too little firmament growth, or are in the least degree infected with disfigure of any kind. See Grafting.

In the conducting of this process, though the vessels of the stock and those of the shoot or graft are, in some measure,
GRAFTING.

Sure, brought into contact and thereby united, as well as those of the latter supplied with nutritious matters from the former, yet their economy remains still the same. Mr. Bradley has considered it as a sort of planting; the shoot or scion rather taking root in the stock or tree into which it is inferted, than uniting itself with it, as is seen by its preserving its natural purity and utility, although fed and supported merely by a crab-stock; which it is supposed depends upon some difference in the vellets of the shoot or scion from those of the stock or tree.

GRAFTING, the act of inferring a shoot or scion taken from one tree, into the stem or some other part of another, in such a manner as to unite and constitute a perfect plant of the same kind as that from which the branch was taken.

It is by this practice that particular sorts of curious fruit-trees of different kinds are capable of being raised with a certainty of their being the same, or not degenerating. It has been observed, that though the plants raised from seed are liable to run from their kinds, and afford such fruits as are not worth the trouble of cultivation; those procured from shoots taken from such trees as produce good fruit, never alter from their kind, whatever the stock or tree on which they are grafted may be; as well as the scions receive their nourishment from the stocks, their varieties are never altered by them, but continue to produce the same kind of fruit as the tree from which they were taken; the only alteration which they undergo is, that when the shoots on which they are grafted do not grow so fast, and afford a sufficient supply of nourishment to the grafts, they do not make so great a progres as they otherwise would do, nor is the fruit they produce so fair, or sometimes so well flavoured, or so large.

This process has the advantage, probably from the supply of nutritious matter being not only abundant but more regular, of rendering the plants or trees which are thus raised more quick in their arriving at the state of maturity, or that of bearing.

It is on tbe different accounts that the practice of grafting is principally had recourse to, in raising different sorts of fruit-trees, as well as some particular sorts of ornamental plants of the tree and flower kinds. It also affords the means of producing different kinds of fruits and flowers of the same kind, in the same stock or tree, as several varieties of pears and apples, &c.

There are different methods of performing this operation, and which are distinguished by different terms or names, as below.

Rind, Shoulder, or Crown Grafting.—This is that mode in which the grafts are let in a fort of circle or crown, upon the top of the cut-off stem or branch.

It is chiefly practised on large trees, when either the head or the large branches are cut off horizontally, and two or more shoots or scions put in, according to the size of the branch or stem; in performing which, the scions are cut flat on one side, with a shoulder to rest upon the crown of the stock; then the rind of the stock is raised up, to admit them between the wood and the bark of the stock, which must be inferted about two inches, so as that the shoulders may meet, and closely join the crown of the stock; and after the whole of the shoots or scions are inferted, all the crown of the stock should be well chayed over, leaving two eyes of them uncovered with it, which will be sufficient for shooting.

It is a method of grafting that was much more in practice formerly than at present, owing to the bad success with which it has been attended; for, as the scions are placed between the rind of the stock and the wood, they are frequently blown out by strong winds after they have made large shoots, sometimes after five or six years growth. Where this method is practised, there should therefore always be some stakes fixed, so as to support the scions until they have almost covered the stock or branch. It is usual to perform the operation in this mode of grafting about the beginning of April, or sometimes a little later.

Stock, Chie, or Slit-Grafting.—This is a mode which is practised upon stocks, trees, or branches, of a smaller size, as from one to two inches in diameter, and may be used with success where the rind of the stock is not too thick, by which the inner bark of the scion will be prevented from joining to that of the stock. In performing it the head of the stock or branch must be cut off with a knife, and a slit made the contrary way, in the top of the stock, deep enough to receive the scion, which should be cut slanting like a wedge, so as to fit the slit made in the stock; care being then taken to leave that side of the wedge which is to be placed outward, much thicker than the other, and in putting the scion into the slit of the stock, great care must be taken to join the rind of the scion exactly to that of the stock; for if these do not unite perfectly, the grafts will not succeed; when this method of grafting is used to stocks that are not strong, it will be proper to make a ligature of bafs, to prevent the slit of the stock from opening; after which the whole should be chayed over, to prevent the air from penetrating the slit, so as to destroy the grafts, only leaving two eyes of the scion above the clay for shooting. It is usually performed about the beginning of March, or sometimes a little later.

Whip, or Tongue-Grafting.—This is most generally practised by nursery-men, especially for small stocks, or branches of an inch, half an inch, or less, as the scions much sooner cover the stocks in this method, than in the other. It is performed by cutting off the heads of the stocks flopping; then making a notch in the flope towards the upper part downwards, a little more than half an inch deep, to receive the scion, which must be cut with the flope upward, and a slit made in this flope like a tongue, which tongue must be inferted into the slit made in the flope of the stock, and the scion be placed on one side of the flope, so as that the two rinds of the scion and flope may be equal, and join together exactly; after which, there should be a ligature of bafs put round to fall the scion, so as that it may not be easily displaced, the whole being afterwards chayed over as in the former methods. It may be performed in the early spring months, with most success.

There are besides the above, some other modes of performing the busines.

Grafting by Approach, or Inarch-Grafting.—This is sometimes called ablation. It is performed where the stocks that are designed to be grafted, and the trees from which the graft is to be taken, stand far together, as that their branches may be bent and united. It is most commonly practised on tender exotic plants, and some other sorts, which do not succeed in any of the other methods. In performing the work, a sort of the stock or branch is cut off about two inches in length, a smooth part of the stock being always chosen for the purpose; and then a small notch is made in this slit downward, in the same manner as directed for whip-grafting; the branch of the tree designed to be inarched having a part slit off in the same manner as the stock, and a slit made upward in it, so as to leave a tongue, which tongue should be inferted into the slit of the stock, joining their rinds equally, that they may unite well together; after which a ligature of bafs should be made, so as to keep them exactly in their situation, and afterwards this part of the stock chayed over to keep out the air. In this method of grafting, the scion is not separated from the tree until
until it is firmly united with the stock, nor is the head of the stalk or branch, which is grafted, cut off till the same time, and only half the wood pared off with a flake, about three inches in length, and the flake of the scion or graft. But in this method of grafting, the operation is not performed fo early in the season as the others; it being done in the month of May or June, when the sap is flowing, at which time the flake and stalk will join together, and unite much sooner than at any other season or period of the year. It is principally employed in raising jasmines, oranges, and other exotic trees of the hardier kinds.

By experience it has been found, that the walnut, fig, and mulberry will take by this method of grafting, while neither of them succeed in any of the other modes. Several sorts of evergreens may likewise be propagated by this method of grafting; but all the trees that are grafted in this way are weaker, and never grow to the size of those which are grafted in the other methods; therefore it is rarely practiced, except on such sorts of trees as will not take by the other methods of performing the operation.

Root-grafting. — This, which is a late improved mode, is performed by cutting the clean smooth roots of the stalks in pieces of five or six inches long, and as large, or a little larger, than the scion; then they are whip-grafted, and tied together very closely, so as to prevent the water from flowing the wounded parts, planting them so deep as that the graft, which should be four or five inches long, may be about half buried. In this way, the grafts themselves will root, and a nearer similitude be preserved to the tree, whence the grafts are taken; and after two or three years, the stalk may be cut quite away, and the graft left to maintain itself. In practicing this method, the grafts should be an inch or two longer than the others.

Season of Grafting. — The period or season for grafting should always be regulated by the state of the weather. From the climate being so uncertain in the spring, it is better to defer it till the circulation of the sap is brisk, and the buds of the stalks begin to break into leaves; attention being had that the weak shoots of tender trees will not admit of being so long cut as the more hardy, and that the operation should never be performed while it actually freezes or rains, or there is snow upon the ground.

Proper Grafts. — In providing these, care should be taken that they are shoots of the former year, as when they are older they never succeed well; that they be always taken from healthy fruitful trees, as when the trees are sickly from whence they are taken, the grafts often partake of so much of the distemper, as not to get the better of it, at least for some years; that they be not taken from young luxuriant trees, whose vessels are generally large, continuing to produce luxuriant shoots, and seldom proving fruitful; and that they be taken from the lateral or horizontal shoots, rather than the perpendicular ones. They should be cut off from the stalks before their buds be in full swell, which is mostly three weeks or a month before the season for grafting; consequently when they are cut off, they should be laid in the ground, with the cut part downwards, burying them half their length, and covering their tops with dry litter, to prevent their drying; if a small joint of the former year's wood be cut off with the bud, it will preserve it the better, and when they are grafted, this may be cut off; for, at the same time, the scions must be cut to a proper length before they are inserted in the stalks; but, till then, the stalks should remain of their full length, as they were taken from the stalk, which will better preserve them from shrinking; when the scions are to be carried to a considerable distance, it will be proper to put their ends into a lump of clay, and to wrap them up in moss, which will preserve them fresh for a month or longer: but these should be cut off from the trees earlier than those which are to be grafted near the place where the trees are growing. It is, however, always the best practice to cut the stalks as near the time of their being inserted into the stalks as possible, as by that means they succeed with much more certainty.

Stocks proper for Grafting upon. — The stalks are the trees or plants for grafting upon; which are either such old trees as are already growing where they are to remain, but the fruit of which is intended to be changed; or such young trees as have been raised in the nursery as a supply to the garden. In the former case, there is no other choice than that of the branches, which should be such as are young, healthy, well-situated, and have a smooth bark. Where these trees are growing against walls or epaphers, it will be proper to graft six, eight, or ten branches, according to the size of the tree, by which they will be much sooner furnissed with branches again, than when a left number of shoots or scions are put in; but in standard trees, four, or at most six scions will be sufficient for the purpose.

In choosing young stalks for grafting upon, such as have been raised from the seed, and that have been once or twice transplanted, should always be fixed upon for the purpose.

After these, those stalks which have been raised from cuttings or layers should confidentially be preferred; but those which are suckers from the roots of other stalks should be rejected, as they are never so well rooted as the others, and confidentially put out a great number of suckers from the roots, by which the borders and walks of the garden will be always pestered during the summer season. Thee, besides being unightly, take off part of the nourishment from the other trees and plants.

And where these stalks have been allowed a proper distance in the nursery where they have grown, the wood will be better ripened and more compact than those which have grown close, and have been drawn up to a greater height. The wood of these will be soft, and their vessels large; so that the scions grafted into them will shoot very strongly; but they will be less diffused to produce fruit than the others; and when these acquire a hard habit at first, it is difficult to reclaim them afterwards. The stalks must, in this case, be fixed to each other, and this will be explained under their particular genera, and in considering the nature of stalks. See Stocks.

 Implements proper for the Work. — These are principally a neat small hand-faw, for cutting off the heads of stalks; a good strong knife, with a thick back, to make cleks in the stalks; with a sharp pen-knife, or budding-knife, to cut the scions with; and a grafting chisel and small mallet. Other sorts of implements are sometimes necessary in performing particular sorts of grafting.

But besides these tools, other sorts of materials are wanted in performing the business, such as balsam-wax, or wood seen, to tie the stalks with; and a quantity of good tough clay, which should be prepared a month before it is wanted, and kept turned and mixed, like mortar, every other day, in the following manner : A quantity of strong good clay, in proportion to the quantity of stalk intended to be grafted, should be provided, and some new well-led horse-dung broken in among it; and if a little straw or hay be mixed among it, it will hold together the better. The addition of a quantity of salt will also prevent the clay from dividing in dry weather, and should be filled and mixed together, putting water to them occasionally, in the manner of making mortar. The whole should be hollowed like a dish, filled with water, and kept every
every other day firmed. It should be carefully kept from being exposed to frost or drying winds; and the oftener it is wrought over the better it will become.

Some have lately made use of another sort of composition for grafting, which has been found to induce the intention of keeping out the air better than the clayey mixture. It is composed of turpentine, bees-wax, and rosin melted together; which, when of a proper consistence, is put on the fock round the graft, in the same manner as the clay is usually applied; and though it be not above a quarter of an inch thick, it keeps out the air more effectually than the clay; and, as cold hardens it, there is no danger of its being hurt by frost, which is very apt to cause the clay to crack, and fall off; and, when the heat of the sunmer comes on, it melts and falls off without any trouble. In the using it, a tin or copper pot is necessary, with a convenience under it to keep a very gentle fire with small coal; otherwise the cold foom condenfes the mixture. It is necessary not to apply it too hot, lest the graft be injured. A perfon a little accustomed to this composition, applies it very fadt; and it is much easier for him to work with than clay, especially when the weather is cold.

In the busines of grafting it is found, that in long-continued dry fasons the grafts are liable to fail in taking, which is sometimes probably owing to the improper choice of the grafts, as well as to the dry weather. Great care should of course always be taken not to graft with weak shoots, particularly those taken from near the top, but fuch as are taken from the lower end of the shoots, and in which the wood is plump and fresh; such as are trimmed feldom or ever take well. When any have mifled in the firing, it has been advised to cut off, about the middle or latter end of June, some fine, healthy grafts of the forts that are wished to graft with, and to open the bark in the fame manner as for budding, inferting the graft with a piece of the former year's wood on it, and after this has been done, to rub in with a brush some of the composition of Mr. Forfryth in a liquid flate; then to warp back around it, as is done for spring grafting, leaving about three eyes in the fhot, which should be tied on with the hafs as fhort as pofible; then covering the outside of the hafs, thus tied up, with the composition to the thickness of about one-eighth of an inch, as well as the end of the shoot, to exclude the air and wet. In about three weeks or a month, the grafts should be looked over, to fee if they have taken. When the graft begins to swell, it will throw off the composition; in which cafe always rememher to apply more to prevent the air from penetrating the incifion or wound that has been formed.

About the month of September it should be examined whether the wounds are all healed up, and the two barks perfectly united; which, if they are, facken the hafs; and when they are perfectly healed up, it may be wholly taken off; but if not, the bafs must be again tied on, and covered with a composition as before, letting it remain till the following spring. It may then be taken off; and if it be found that the two barks have separated during the winter, with the point of a sharp knife, all the brown part of the bark (which, if left, would infallibly bring on the canker) should be cut out, and the composition rubbed into the wound. When the grafts have produced strong leading shoots, the tops of them should be pinch'd off with the finger and thumb; but if they have not fhot strongly, they should not be cut till the spring, when they may be cut down to three or four eyes, according to their strength, to make them produce horizontal shoots, and form handsome heads. This sort of grafting should always be performed in moist or cloudy weather, if possible; as under fuch circumstances the operation mostly succeeds better.

It has been remarked by Mr. Forfryth, that rubbing a little of his composition into the incifion will effectually prevent the canker, and in applying it round the graft, a much lefs quantity is fufficient than of the clay; as it need not be more than three inches round in grafting small fights or shoots, and in proportion for thofe which are larger. It keeps the fcion moist. When used in grafting, it should be of fuch a consistence as to work easily with the hand, or a knifc, or small trowel, rather fober than grafting-clay generally is. This method, on a fair trial, will, he thinks, be found "a fure, neat, and expedient way of grafting."

In grafting, or budding, they should be performed as near to the upper fide of a bud as poflible, and the mud proper place for inferting the fclons or buds is at the joints, a little above the crofs fhot.

And in refpect to the forts of trees that will fucceed upon one another, it may be obferved that all fuch as are of the fame genus, that is, which agree in their flower and fruit, take upon each other; hence all the nut-bearing trees may be safely grafted on each other, as well as all the plain-bearing trees, as the several forts of pums, almonds, peach, nectarine, apricot, &c., but as many of them are subject to admit gum from the parts wounded, as the peach and nectarine kinds, it is found the fureft method to bud or inoculate them.

All fuch trees as bear cones also do well upon each other, though they may differ in one being evergreen, and the other shedding its leaves in winter; as in the cedar of Libanus, and the larch-tree, which are found to succeed upon each other; but they must be grafted by approach, as they abound with a great quantity of refin, which is apt to evaporate from the graft, when separared from the tree before it is joined with the fock; whereby they are often deftroyed. The laurel-likewise on the cherry, or the cherry on the laurel. All the nut-bearing trees are also found to take upon each other, and those which have a tender soft wood do well if grafted in the common way; but such as are of a firm conftant, and are slow growers, must be grafted by approach. It is likewise by this method that many kinds of exotifc trees are not only propagated, but also rendered hardy enough to endure the cold of our climate in the open air; as by being grafted upon focks of the fame kind which are hardy, the grafts are rendered more capable of enduring the cold, and the general effects of the atmosphere.

**GRAFING Wax.** See Wax.

**GRAFTING Tool.** In Engineering signifies a kind of fpade, made very frong and curving, used in digging canals, often called only a tool; see fig. 50. CANALS, Plate VII.

**GRAFTON,** in Geography, a town of America, in Windham county, Vermont, chartered by the name of Tomlinson, but affuming its new name in 1791. It contains 1,109 inhabitants, and lies W. of Rockingham, adjoining. **Grafton County,** a county of New Hampshire, bounded N. by Canada, S. by the counties of Strafford, Hillsborough, and Cheshire, W. by the state of Virginia, and E. by the district of Maine. It is divided into 52 townships, and 17 locations, and contains 25,692 inhabitants.

**Grafton,** a poll-town in the county above-mentioned, 13 miles S.E. of Dartmouth college, and 19 S.W. of Plymouth. It was incorporated in 1758, and contains 682 inhabitants. Lapis specularis, of the best quality, is found in this town; it lies in a mountain about 20 miles E. of Dartmouth college, adhering to the rocks of white or yellow quartz, and lying in lamines, like felts of paper.

**Grafton, the Hopiamahoes of the Indians,** a township in Worcester county, Massachusetts, containing 985 inhabitants; 40 miles S.W. of Boston.

**Grafton, Cape,** a cape on the coast of New Holland,
GRA

GRAFTON ISLAND, the most northerly of the Bahama islands, in the East Indian sea. N. lat. 21° 8'. E. long. 118° 14'.

GRANANO, a town of Naples, in Princepato Citera; 11 miles W.S.W. of Salerno.

GRAHAM'S ISLAND, one of the Aladim islands, in the Mergui Archipelago, about 6 miles in circumference. N. lat. 9° 19'.

GRAIG, or graignamanax, a poll-town of Ireland, in the county of Kilkenny. Here is a good bridge over the Barrow, and the tide flows up. It is 58 miles S. by W. from Dublin.

GRAIN, John Baptist lee, in Biografie, was born, in 1565, at Paris, where he was educated with great care, and in early youth he was introduced to court, and attached himself to the service of Henry IV. He was appointed by that prince to the office of counsellor, and master of requelts in ordinary to the queen, Mary de Medicis. His employment was in writing, and in attending on the education of his children. On their account he drew up Memoirs relative to the history of France, which were published in MS. till the chancellor de Sillery perused them and published a part of them. His first publication, which he printed in his own house, was entitled, "Decade contenant l'Histoire de Henri le Grand, Roi de France et Navare, IV. du Nom," fol. 1614, in ten books. It comprises the period from the peace in 1559, to the king's death in 1610. He published a second decade, including the history of that king's reign, in 1618. The former decade was presented to the young king Louis XIII., who was highly delighted with the freedom displayed by the author, and it was at his desire that the other was made public. Le Grain, though fortunate in pleasing his sovereign, made himself many enemies by the honesty and candour which he displayed in the narration. Attempts were made to procure a cenfare upon it from the Sorbonne, but they were unsuccessful, that body declaring that they found nothing in it deserving of cenfare. The real grounds of the objections to it were that the author had supported the liberties of the Gallican church; that he had cenfured attempts to introduce into France those articles of the council of Trent, which had been rejected; that he disapproved the establishment of new religious orders, and was not favourable to the perfection of heretics. For these sentiments, which ought to have endeared him to his countrymen, he was continually harassed by bigots, till at length an order was procured from the king for the suppression of all the copies of his work, which remained in his hands. The treatment which he experienced disfigured him with the court, and he went into retirement on his estate of Montgeron, where he died in 1642. He left in MS. a manifesto relating to all the proceedings respecting his book, which is said to display in glowing colours the discouragements attending honest historians under an absolute monarchy. He left likewise the third decade of his history, and some chronological pieces in MS. Moreni.

GRAIN, Grain, primarily denotes a fruit, or feed, growing in a spica, or ear.

In this sense, grain comprehends all sorts of corn; as wheat, rye, barley, oats, &c.

GRAIN, Structure of. There are three particulars observable in every grain, whether it be wheat, barley, oat, or whatever else of that kind. These are, 1. The outer coat or pellicle, which contains all the rest. This in the same species of grain is found to be very different in thickness in different ears, and as it has grown in different soils, Vol. XVI. 2. The germ or bud; this is always hid within the feed or grain, and is the plant in miniature that is to arise from it. (See: Bud and Germ.) And, 3. The meal, or that farinaceous matter which is included in the skin, and which turns the germ, and serves to give it nourishment when first put into the earth, before it is capable of drawing it from the earth itself. Dr. Grew, in his Anatomy of Plants, has treated of this at large. See FERMENTATION OF PLANTS, GERMINATION, VEGETATION, &c.

The whole structure of the plant which produces these feeds is equally admirable. The chaffy hull is admirably adapted to shield and defend the feed as long as that is necessary, and then to let it fall; and the stalk, formed hollow and round, is necessarily at once light and strong, capable of sustaining the ear, without absorbing too much of the juice, directed to its nourishment; and the seeds of many kinds are a defence against the birds; that would otherwise destroy the feed before its ripening. The covering of the feed is formed of two membranes, which meeting in a line on one part of the feed, form together that furrow we fee on it. This is the place at which the feed is to burst open on being moistened. Had not nature provided this means of the germ's coming out, the toughness necessary to the coat of the feed, as a defence from injuries, would have suffered the farinaceous matter and the grain to rot together, within it, before it would have given them way to come out, and for the germ to grow.

Nor is this the only use of this place of opening. The great Creator of all things has provided these feeds, not only for a supply of the same species of plant, but for our food, and for that of birds, &c. We have art enough to erect machines for the reducing of the farina to powder, and the freeing of it from its covering membrane; but the birds eat it as it is, and it would pass through them whole, and without doing them any good, were it not that the juices of the stomach swelling it up, it bursts open at this furrow, and all the nutritive matter pours itself out. De Landes, Traité Phys. p. 62. See FARINA, PECULIUM, FLOUR, BREAD, &c.

For the laws relating to the importation and exportation of several sorts of grain, as wheat, barley, oats, &c. See CORN.

The cleaning and preparing of grain in a proper sweet condition have long been objects of considerable importance, but it is probable that the latter cannot be effected for any great length of time.

Different methods of managing grain, after being threshed out, are practised by farmers; some keeping a large proportion of it in the chaff on the barn floors, while others, after having it cleaned, put it into facks, and place them in the same situation, or in some room appropriated to that purpose, until they can be sent to the market. But each of these methods is liable to much objection; as when it remains for any length of time on low damp floors, it will obviously soon become musty, however much precaution is taken to prevent it, whether it be in facks, or in a loft, flate without being cleaned.

There is another practice sometimes employed in the northern parts of Scotland, according to the author of "Modern Agriculture," which is, that of twining straw into large bands, or ropes, and coiling them up in the manner of the cables of ships, placing the grain, when threshed and cleaned, within the coils, in a sort of well, as it were. But as the grain in this way rests on the ground or floor, and, of course, is liable to imbibe damp, it is not less objectionable than the others, while it is much more troublesome, and more exposed to loss.
BOOK OF GRAIN

It has been advised, in order to preserve grain in a proper state after threshing it out, to have it as expeditiously as possibly cleaned from the chaff, when the air is in a dry state, and put into a room, shed, or bin, which is perfectly dry and free from any sort of moisture, until it can be properly placed in the granary, or be sent away for sale. This should always be effected as early as possible, as, by delaying the cleaning of the corn, the sample is very liable to be injured.

The cleaning of the grain is performed in several different ways; but where threshing-machines are in use, they are now mostly confined in such a way as to execute it at the same time the threshing is going on. The winnowing-machine is also frequently employed for the same purpose, and answers perfectly well. And in some situations the casing-hose and sifter, or flat broom, as well as the 'feetle,' are made use of, the broom serving to remove the chaffy parts and the more minute heavy particles which are separated from the grain by the wind. This method can, however, only be employed with advantage where there is plenty of barn-room; under other circumstances the winnowing-machine is far more beneficial and proper. The practice of cleaning grain on the barn-floor, by means of the wind, is not only tedious and troublesome, but an extremely imperfect method.

In whatever way the extraneous matters have been removed from grain, it should, as soon as the operation has been performed, especially in barley and wheat, be put through a sifting-machine, which, in most of the more improved threshing and winnowing-machines, is provided with this intention, and is thereby rendered free from all sorts of small seeds and other foreign matters. In this way the ova of different sorts of insects are also removed, and the production of the weevil, moth, beetle, &c., prevented, as well as the destruction which they commit while in their volumetric state, guarded against.

Screen machines may be had separately from the others; but the work of cleaning the grain is the most readily, cheaply, and conveniently performed, where they are connected with the other necessary machinery.

It has been suggested, that as the prevention of all sorts of corn from being affected by the different causes that have a tendency to injure it, when laid up for the purpose of keeping, depends upon its being put by in a perfectly dry condition, and on its being afterwards preserved in that situation; so it is of much consequence, in those cases, to keep it from the period of its being threshed out of the straw, as much as possible from coming in contact with the earth, stone, or any other sorts of floors that are placed near to, or upon the ground, as they have constantly a great disposition to communicate moisture, and in that way injure the grain that relays upon them.

It is likewise found to be a highly beneficial practice to prevent, as much as possible, the entrance of the atmospheric air, whenever it is much loaded with humidity; as from the vast extent of surface that is exposed to its action, it is easy to perceive that it must be highly prejudicial to the corn, by imparting its moisture to it, as a sort of mucor, or mould, is thereby brought on, that is attended with a mufly disagreeable smell, and that prevents its keeping in a proper manner. In regard to the means of prevention, they must be different in different cases; but much may be done in the first of the above situations, by cautiously avoiding the too general practice of permitting the corn to remain upon the threshing-floors in the barns, particularly where they are of the earthy or rocky kinds, too long after it is threshed out, before it is cleaned from the chaff, and other extraneous matters; or, after it has been cleaned, by preventing its being deposited upon them, either in the looie state, or in sacks. And farther, by having great regard to the dryness of the air when the binyards is performed.

In instances of the latter kind much is capable of being accomplished by having proper apparatus, such as slides, shutters, and other suitable contrivances, fixed in the pipes, funnels, and other openings, designed for the purpose of ventilation in the corn-chambers and granaries; which should be preferred, constantly shut in a close manner at all times when the air is much impregnated with watery particles, so as to prove hurtful to the grain. Damp and frosty weather are, of course, always improper for exposings grain to the air in, as it must, in such seasons, do great mischief. But, besides air, light is essential in the preservation of grain in these circumstances, as, where it is not admitted pretty freely, a kind of vegetable mucor, or mould, as already noticed, is liable to fix upon the grain, and injure it greatly. The ingenious author of the 'Philosophy of Gardening and Agriculture' has remarked, that this possesses the same property as that of other funguses, of growing where there is scarcely any change of air, and in places where there is little or no light, provided there be the necessary degree of warmth and moisture. On the same principle, with the intention of retaining the grain in a state as free as possible from dampness, it is suggested by the same writer, that it might be useful to have well constructed floves in the bottom parts of corn-chambers and granaries, for the purpose of occasionally communicating such moderate degrees of heat to the grain so as would be sufficient to dry up and expel any injurious moisture that it might have attracted in damp wet seasons. On this idea it has, indeed, long ago been recommended as supported by experience by Mr. Tull, to preserve wheat, by exposing it to the action of a sun-shine degree of heat upon a hair-cloth, in a malt-kiln, produced by the combustion of clean straw, for such a length of time as may be necessary to remove the dampness, as from four or five to ten or twelve hours, according to the proportion in which it may exist. But in this method the heat should be cautiously kept at moderate as not to destroy the vegetable property, or life of the grain, as, if that were the case, its preservation and decay would be promoted. The degree of heat that would be the most adapted to answer the purpose, in different cases, would be easily regulated by those instruments which are in general use for measuring the heat and moisture of the atmosphere. These principles affult us much in reconciling the differences of opinion that have to long prevailed in respect to the use of air in the preservation of corn in granaries, as they sufficiently show, that when admitted in its perfectly dry and elastic state, it must be particularly useful in carrying off any moisture or disagreeable smell that the grain may have contracted by remaining closely heaped together for some length of time; as, by the stirring that mostly accompanies the ventilation, it must necessarily operate in a very extensive manner; but that when applied in its moist heavy state, it must be detrimental in an equally proportionate degree, by imparting its humidity to the grain, and thereby causing a fort of mildewing.

It is probable that the ventilation of grain is the most completely effected by stirring it by means of proper slides, doors, or other similar contrivances made in the floors, windows, and other openings of the granaries or corn-chambers; but it is capable of being accomplished in a more flow and less economical manner by shovels, rakes, and other similar tools. And in order that the work may be more readily and more effectually performed, the grain should not be spread
spread out too thickly over the floors of the granaries and
corn-rooms. From one to two feet, or two feet and a half
in depth, is considered fully sufficient for the purpose, in
proportion as it becomes more dry and the moisture more
dissipated. When grain is heaped together to too great a
thickness at first, from the natural moisture which it con-
tains, it is frequently apt to heat, and thereby greatly
injure the sample. Frequent screening should likewise be
had recourse to immediately after its being deposited in the
corn-rooms, and occasionally at other times as circumstances
may demand.

Other points have been suggested by Doctor Darwin, as
necessary to be attended to in this business, in order to
perform it in the most effectual manner; such as those of
having the doors, windows, and other principal apertures
of the buildings placed in such a manner as to face the
south, and as close to the ceiling as possible, so that the
rays of the sun may enter with the greatest freedom. And
in addition, the linings of all such corn-rooms should con-
stantly be formed of such materials, as have no tendency
to their coldness to precipitate the moisture from the
atmosphere, which is frequently the case with particular
substances, when warm, damp, south-well winds take place
after cold or east airs, and in that way impart it to the
grain that comes in contact with them. It is also equally
necessary in all such cafes that the entrance of wet and
moisture should be prevented in an effectual manner, by
having recourse to proper sheltering boards, slides, and other
contrivances of the same kind.

There is likewise a particular sort of management neces-
fary in the turning over and stirring of grain in order to its
complete ventilation, as when the corn is first placed in the
rooms it hangs in need of much more frequent turning over
than afterwards, when it has parted with a considerable
proportion of its moisture and is become somewhat dry.
For the first month or six weeks, once or twice in every
week or ten days may be sufficient to answer the purpose;
but afterwards for four or five months longer, about once
in the fortnight may commonly be sufficient, and from that
period only once in the month, except when the season
proves very moist, warm, and of course improper for keep-
ing the grain well.

In order to accomplish this business different methods are
in use; it is the custom in some places to have empty spaces
left on the sides of the heaps of grain and other parts into
which they may be turned over when necessary; while in
others, square holes are formed in the ends of the floors,
and round ones in the middle, by which means the grain
is thrown from the upper to the lower chambers, and back
again, and of course becomes agitated and exposed to the
air in a more perfect manner. This is a method that is
practised with success in some parts of the county of Kent.
As, however, in these methods such frequent turnings are not
only extremely troublesome, but expensive, in consequence,
especially in the first cafe, of being performed by the
hovel, the plan of having filling flutters in the middle of
the different floors so contrived, as to have an inclination
towards the centre of the granaries, has been laid recor-
d to by the occasional removal of which, and the opening
of the windows and ventilators, the grain is turned and
exposed to the influence of the air at the same time with
great cafe, convenience, and dispatch.

This mode of preferring grain was long ago found by
Monseur du Hamel to answer perfectly well, even in cafes
where it had been laid up in a moit, damp, and improper
state.

There can be no doubt, however, but that grain may
be preferred without having recourse to the means of venti-
lution, by depitting it, when in a perfectly dry state, in
dep pits, pits, and caverns that are free from any sort of
damp and moisture, and so far below the surface of the
ground that it cannot be affected by the heat or the changes
that take place in the seasons. But though grain has been
known to have been preferred in this manner for a great
length of time in those countries where it is the practice
to have it stored up for times of scarcity, it is by no means
either a very safe or convenient method.

It must be observed, however, that in whatever manner
grain is secured, it is essentially necessary that care should
be taken that such portions as are in a hot damp state, or
which have been badly har vested, should not, on any account
be laid up with that which is in a dry condition and perfectly
found; as from the quantity of moisture that is contained
in it, and the tendency to germination that takes place in
consequence of it, a small bad smell is liable to be im-
parted to the whole, and the sample either totally or in a
great degree destroyed.

The practice of exposing grain to the free action of the
atmospheric air, has been followed by some, in consequence
of the ova or eggs of insects being liable in that way to be
depitted among the grain, but it would seem more pro-
bable, when the economy of such insects is well considered,
that their ova were either depitted originally among the
grain in such situations, or brought in with different parcels
of it from different places. On this account it is evident
that great caution should be used in furnishing fresh parcels
of grain for being laid up, and that the screen should be
constantly employed before putting it into the rooms.

It is, however, pretty certain that where grain is to be
preferred for much length of time, though it may without
doubt be safely kept in the ways that have already been
mentioned; yet it is most probably only a much better,
but more certain and economical method to let it remain
untouched from the ear in the stacks in which it has been
built, particularly where they rest upon sladles that are
properly constructed for the purpose.

It may be proper to observe, that where grain is to be
long preferred after being threshed out, there should always
be proper buildings of the granary kind provided for its
reception, the sizes of which should be proportioned to
the extent of the farm, being constantly adequate to con-
tain about one-half of the grain-produce after it has been
threshed out and cleaned.

In cafes where the grain is ground and preferred after-
wards in the state of meal, it is the usual and by far the
best mode to pack it very closely by means of trampling or
ramming it into dry, close, small rooms, or large cellars, or
in this way, when laid up in a proper condition, it will
keep for a very great length of time quite safe and free
from mischief.

But, notwithstanding the custom of preferring grain in
stacks and granaries, from the convenience of it, may, in
some instances, be beneficial, not only to the farmer, but
and, consequently, in some measure necessary, it is clear
from the trials that have been already made, that the
storing of grain in either way should be carried to as
small an extent as possible, as it has been ascertained
that there is a constant decrease taking place in its weight
from the period at which it has been har vested or laid up,
that this loss is far greater at first, than alter it has been
kept some time.

In the second volume of the new edition of Georgiads
GRAIN.
GRAIN.

Essays, published by Doctor Hunter, the lots is rated by Mr. Holt to be in the following proportions in different sorts of grain:

In Wheat.

On being rubbed out in the hot-furn, and weighed the 31st of August, 1789, soon after being cut, afforded... 6 3
On being weighed again on the 18th of October... 0 2 0

Lofs of weight, per bushel, of 70 lbs. nearly... 6 8 3
Or almost one-tenth of the whole in forty days.

Of this wheat, thirty-two grains weighed one penny-weight.

It is, however, remarked, that this is the greatest possible loss that the grain can sustain, as though it was in a full state of maturity or ripeness, it had neither had the benefit of being dried by exposure to the sun after being cut, nor undergone the process of fermentation after it was put together.

In Wheat.

Another quantity, weighed on the 1st of October, produced... 0 6 3
Weighed again 23 days afterwards, afforded... 0 6 0

Lofs in that time per bushel, at the rate of... 2 11 15
A further quantity, weighed on the 8th of January, 1790, produced...

Lofs per bushel, on being weighed again 32 days afterwards, at the rate of... 2 0 15

In Barley.

On being weighed on the 25th of September, under similar circumstances, produced... 0 2 2
On being weighed again on October the 18th, afforded...

Lofs of weight per bushel of 60 lbs. about one-fifth of the whole in 47 days.

Twenty-four grains of this barley were found to weigh one penny-weight two grains.

In Oats.

With this sort of grain no experiment appears to have been made by the writer, but there can be no doubt but that the loss must be equally great as in any of the other sorts.

The results of these trials render it sufficiently evident, that the more e. pedantically grain is brought to the market, the less is the loss which is sustained by the cultivator.

Of course it should never be laid up or kept in any other way longer than circumstances render it necessary. But in addition to the loss that has been seen to occur from the gradual diminution in the weight of the grain in consequence of the dilution of the grain and of the moisture which it contains, there are others that arise occasionally from the ravages of different kinds of vermin, and the effects of damp, mould, and various other causes.

In regard to the preservation of grain from the depredations of insects, and other similar animals, it may probably be the best accomplished by a timely and frequent use of the screen, with proper ventilation, as has been noticed above.

Where the injury is produced by the weevil, the moth, or the beetle, it has always ceased at the period when these vermin appear, as they are, when in this state of existence, merely propagators of their several respective kinds of vermin, which, while they continued in that state or form, produced the injury.

In their ultimate or infect state they eat or consume very little, their business being principally that of depositing their own eggs, which they do by a sort of unerring instinct, in situations where the large collections of grain are free to furnish food for their succors during the period in which they are in the vermicular state. It is consequently a matter of great moment to prevent the generation of them, by the destruction of the eggs before they are hatched, which is usually the best performed by having recourse to the screen, and exposure to a free air, as has been already shown.

The frequent flitting of the grain breaks the cohesion of their own eggs, by which the nidus of this minute vermin is destroyed, as on hatching they collect together, and spin or weave numerous webs of a cob-web-like substance for their own security and protection. And a great number of grains are attached together by these webs, by an infinity of small threads both for their safety and food. Consequently, when their habitations are broken and separated by the use of the screen, they fall through its small interstices, and are capable of being easily removed with the dust and other refuse matters; and such as escape the early screenings are destroyed by those that follow, and the grain of coarse little injured by the operation, being only rendered more clean and free from impurities. See HArvesting of Grain, REAting of Grain, and STACKING of Grain.

GRAIN is also applied to the fruits or seeds of divers plants, as a grain of mullet, of pepper, &c.

GRAIN is also extended to a minute body, or parcel of a body pulverized. In which sense we say, a grain of sand, a grain of salt, a grain of gunpowder, &c.

GRAIN denotes also a small weight, used in estimating divers substances.

The grain is the smallest of all weights known in England. It is taken from the weight of a grain of wheat, gathered out of the middle of the ear, and well dried. By Stat. 12 Henry VII. cap. 7, every flinking or penny-weight was to weigh thirty-two such grains; but now twenty-four grains make a penny-weight, and twenty penny-weights an ounce. See PENNY and WEIGHT.

The grain is troy weight, and used in the weighing of gold, silver, jewels, bread, and liquors.

Among the ancients, the grain was the fourth part of the stola, or twelfth of the obolus, and the twenty-fourth of the drachma. It coincided with a scr.

Fenelius, lib. iv. cap. 6. Method. Medic. affirms it as a thing known and certain, that the grain is of the same weight everywhere; but he is mistaken. Mr. Gravers, in his treatise of the Denarius, in his Miscell. Works, vol. i. p. 276. has shown, that 179 Dutch grains, which Smellicus had found to be the weight of a Philip of gold, only amount to 134 English grains. Add, that Mouf. Perrault has computed the French grain to be less than the English, and yet bigger than the Dutch; to the English, it is as 158 to 134; and to that of Holland, as 178 to 179. See WEIGHT.

The grain used by the apothecaries is the same with that of
of the goldsmiths; though they make a difference in the weights raised from it. Thus, 20 grains, with them, make a scruple, 9; 3 scruples, a drachm, 3; 8 drachms, an ounce, 5. &c.

The carat used in estimating the fineness of gold, as well as in weighing diamonds and precious stones, is also divided into four grains; and the carat is about the one hundredth and fifteenth part of an ounce troy, according to Mr. Jeffreys, in his treatise on Diamonds and Pearls.

Hence, the jewellers' grain is to the troy grain, inversely, as 600 is to 480, that is, directly as four to five.

GRAIN.—In English troy and apothecaries' weight, is the 48th part of a troy pound = 20 mites = 480 druits = 5600 periots = 252.400, blocks, of the assayists, = 820.856 French grains = .36475 grams of the new weights of France = .000142877 pounds avoirdupois.

GRAIN, a weight in France, = 1.21893 English troy grains = .00017413 English pounds avoirdupois = .0531217 grams of the new weights.

GRAIN is also used for the figure or representation of grains on stones, fluffs, leathers, &c. Thus we say, morocco, has a bold and richer, that is, a larger grain, than flan-green.

In some marbles, the grain is very fine; in others coarser. Steel is known by its grain, which is much finer than that of iron.

GRAIN, in Mining, is applied by quarry-men and masons to the minute figures in most blocks of stone, by which they are distinguished from most other materials that are distinguished in any direction, and the grain in this way is very evident, as being of the same kind, and in the same direction, by working the figures of the minute plates of mica, or silver, as they call it, which are frequently found arranged, in the stone, in the direction of the grain, or best of the stone; which, in grains, is not always that of the beds or stratification, many rocks having stratification which crosses their beds obliquely, often at an angle, of from 30° to 45° with the bed or plane of the stratum, and such stratification, not uncommonly, divide the stone from its sides or parts, or even tile-stones, or plates for houses, and into the most thin and perfect lamina. Sometimes the name of the stone they are distinguished into, and such stratification itself, as Mr. Kirwan observes of the argillites or flates, p. 293 of his "Geological Essays." See Stratula and Strata.

GRAIN, Casked. See COCHNEAL.

GRAIN, Scarlet. See SCARLET.

GRAIN, Oily, in Botany. See MyAGRAM.

GRAIN, Tin. See STREAMING and TN.

GRAINS, in the Materia Medica, or the seeds of vegetables, are distinguished into emollient, which yield a considerable quantity of mucilage and oil, which may be separately extracted from them; such are almonds, and the seeds of most all fruits; and farinaceous, which are entirely composed of a dry substance, easily reducible into a fine powder, called meal. Of this kind are the grains of all grasses, and of plants.

GRAINS, in Rural Economy, a term applied to the remains of different substances of the grain kind after they have been employed in the brewing of beer, or the distillation of spirituous liquors. They are in much use by the farmers and cow-keepers near large towns for the feeding of various descriptions of domestic animals, such as milch cows, hogs, fowls, geese, ducks, &c. as well as sometimes for the fattening of neat cattle. In this last intension, it is however necessary to mix other substances with them, such as good pul-lard, coarse ground oatmeal, &c. It must be observed, that these matters can only be made use of while they are in a fresh state with advantage. It is of course necessary, particularly during the more hot fummer months, to employ such means as are proper for preventing their running into a state of fermentation, which would render them wholly useless. This is usually effected by having them well prefried and trodden down into large vats and ciphers, formed deeply in the ground, and covered from the action of the air. In this way they may be kept perfectly sweet and fit for use for a considerable length of time. See COOKING and STALL FEEDING.

GRAINS of Paradise. See MEDIA.

GRAIN-Coal, Malagueta, or Pepper-Coal, in Geography, a country of Guinea, extending about 300 miles along the coast of the Atlantic from the vicinity of Cape Palmas to that of the river Mefaruda, but its limits are not precisely ascertained; and bounded by the country of the Foulahs, or the Sierra Leone country on the west, and the Ivory Coast on the south-east. It derives its name from the great quantity of Guinea pepper which it produces. The climate is infectious, and is found to be particularly noxious to Europeans. The productions of this country are perfumes, gums, grains, lemons, oranges, bananas, and a kind of nut with a thick shell, which is a most delicious fruit. The palm-wine and dates are in high perfection; cattle, hogs, sheep, and goats, are very plentiful; but this country derives its chief wealth from the abundance of Guinea pepper, or grains of Paradise, called Malagueta by the Portuguese, which it produces. It supplies also a considerable quantity of pimento. Its commerce has also very much benefited in ivory and slaves. The natives are reckoned temperate and abominous; but they are said to allow Europeans every kind of familiarity with their females, and to invite them to love-banquets with their own wives and daughters. They are actuated in common with other negroes, by an insensible propensity to steal, not only from strangers and foreigners, but from the nearest of their own kindred. Their language is peculiar to themselves, and difficult of attainment. Their trade is carried on by signs and tokens, some of which are not very decent. The natives are, in general, well-formed, and handier in their persons and features. Their common dress is a "pan," or unshaped piece of cloth round the waist. They are extremely subject to hernias and ruptures. They have among them some excellent mechanics, some of whom understand and practice the art of tempering steel, making arms, and all steel instruments, and constructing canoes; others have introduced improvements in husbandry, particularly with respect to the method of cultivating rice, millet, and Guinea pepper. Their king, called "tala," "taba sley," or "taba sell," exercises despotic authority over his subjects, and never appears abroad without the utmost pomp and magnificence; and he receives from the people a degree of veneration and awe, which belongs to superior beings. They are said to be believers in a future state, which appears by the ceremonies performed to the souls of the deceased and the prayers they offer for a happy meeting in another world. They welcome the new moon with songs, dancing, and every kind of diversion; and their superstitious regard for foresters is extreme. The sole employment of many of the negroes, especially about the river Sellos, is fishing, which they perform in their canoes by a hand-line and hook. The artificers of Sellos are...
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are also peculiarly expert in their manufacture of iron and metals.

The Portuguese, possessed for many years an independent and uncontrolled connection with this country; but in the year 1654 the English and Dutch, perceiving the advantages which were derived from their commerce, interfered, and their rivals prevailed to such a degree as to drive the Portuguese settlers into the interior parts of the country, where they united themselves with the natives; and from this intercourse sprung that mixed progeny of Malattos, who are more numerous here than in any part of Guinea. The small remnant of trade now possessed by the Portuguese is entwined with these perfons, to whom they give the appellation of the ladigos or gentleman, having professedly to them their forms of Christian faith and practice, and initiated some of them into holy orders, whom they employ in propa gating their notions of Christianity.

The months most favourable to trade on this coast are February, March, and April; small vessels, which are capable of faling up the rivers into the country, are more convenient than large ships; and it should be recollected, that the S.S.E. winds begin to blow in the month of May, and they bring with them heavy rains and tornadoes, with terrible thunder and lightning, extremely dangerous to shipping.

GRAINE, an island in the mouth of the river Thames, about 35 miles long, and 25 broad, separated from the coast of Kent by a narrow channel, called the "Stray," or "Yenlade." It is low, flat, and marshy, and has upon it only a number of detached huts, with some salt works. N. lat. 57° 27'. E. long. 0 42'.

GRAINED MEDALS. See MEDAL.

Graft. GRAINED Staff. See CROSS GRAINED.

GRAINGER, James, in Biography, a physician and poet, was born at Danse, a small town in the south of Scotland, about the year 1723. After finishing his school education, he was sent to Edinburgh, where he commenced his medical studies under professors who were highly celebrated through the medical world, and in due time he received his degree of M. D. He commenced his professional career as surgeon in the army, and in that capacity he served in Germany, under the earl of Stair, till the peace of Aix-la-Chapelle, in 1748. He afterwards settled in London, and practised as a physician. He here obtained and cultivated the friendship of several distinguished literary men; particularly of Shenstone, and Dr. Percy, afterwards bishop of Dromore. While in London, he published his translation of the elegies of Tibullus; but this work did not receive the approbation to which he thought it entitled, especially from Dr. Smollet, whose criticisms were the occasion of a long paper-war between them, and produced an irreconcilable difference. Probably his success in practice in London was not great, as he embraced an offer of settling advantageously in the island of St. Christopher, in the West Indies; where, by marriage, he became connected with several of the principal families, and practised his profession with great success. He continued, however, to cultivate his attachment to the muses, and wrote, during his buc...
after the appellation of it to Gramineae. The Latin word *gramen* is supposed to be derived from *gradens*, going or proceeding along, in allusion to the great increase of many of these plants by their creeping roots.

Jussieu's second class consists of monocotyledonous plants with a superior germen. His definition of the present order is as follows:

Calyx, (which he terms *gluma*), single or many-flowered, enclosing, in the latter instance, two or more flowers, disposed in two ranks in a little spike or ear; it is mostly of two valves, rarely of one or of many, or altogether wanting. Each flower has a corolla, (called *edge* by Jussieu) resembling the before-mentioned calyx, mostly of two valves, rarely of only one, or altogether wanting; the outer valve either beadless or awned. Stamens below the germen, of a definite number, except in the *Paria* of Aulanth, generally three, rarely two, or six, or one; their anthers oblong, forked at each end. *Germen* one, superior, accompanied at the base by two little scales, not always evident. *Styles* often two, with two feathery stigmas; sometimes one, with a simple or divided stigma. *Seeds* in either instance solitary, naked, or often clothed with the permanent inner valve of the corolla. *Embryo* small, attached below to the side of the farinaeous and much larger *albumen*. The lobe of the embryo in germination is permanent and fertile along with the annexed albumen, attached on one side, at the bottom, to the primary leaf which surrounds the plumula, or bud of the future plant.

The roots are fibrous and capillary. *Stems* or *culms* cylindrical, either hollow or filled with pith, jointed or separated into distinct portions by knots, mostly simple and herbaceous. *Leaves* alternate, generally solitary at each knot of the stem, sheathing, their sheath splitting down to the knot. *Flowers* either in dense clusters, or spiked upon a common *rachis*, or panicked, concealed before they arrive at maturity in the sheath of the upper leaf. Some species are monocious, by an abortion of some of the organs.

Botanists have differed much about the principles on which the genera of Grasses should be founded. Linnaeus and Jussieu take into consideration the number of flowers, or rather florets, in each calyx; Haller in a great measure rejects this, paying regard chiefly to the figure of the parts, which indeed is of primary importance. He does not, however, sufficiently attend to other equally important marks, as the distinction, for instance, between *Poa* and *Brixa*, consisting in the incorporation of the seed of the latter with the large valve of the corolla, and its deprecating figures. It were to be wished that the names of Grasses were permanent and constant in the same genus, or at least species, but though constant in some, as *Avena*, in others, as *Agrostis* and *Triticum*, they are not sufficient to discriminate species.

In the sexual system Grasses chiefly belong to *Triandra Digyna*. Some few have proper monocious, some dioecious, flowers, and several are polyanthous, having a few male blossoms intermixed with perfect ones furnished with both stamens and stigmas, and were therefore referred by Linnaeus to *Polygama*. But this latter circumstance is so common and variable, and causes such unnatural separations of species or genera, that botanists have generally agreed to pay no regard to it in this family, but to class all such grasses by their perfect flowers.

Linnaeus remarks that "Grasses are the most general of plants, constituting almost a sixth part of all the vegetables on our globe, especially in open situations. There they multiply, and extend themselves by creeping roots, to a vast extent. In confined and woody places they scarcely creep, but grow erect. They are the most important of plants,

especially as affording the chief succulence of animals who feed on vegetables. They furnish the verdure of our summers, and spread a carpet over our meadows. Their leaves are not easily damaged, even by our walking over them; and though winter destroys their foliage, and the early spring finds them dry and withered, they revive in a wonderful manner from apparent death. How efficaciously has the Author of Nature protected these plants, by giving them such hardy items, while they are perfecting their feed, that cattle cannot readily attack them in that state! Then, on the other hand, they are so constituted, that the more their herbage is cropped, or hardly used, the better they thrive, and extend themselves the more under ground. That they may be able to exist in almost every situation, their narrow spiny leaves are purposely contrived to intimate themselves between other plants."
The grasy crown, corona graminea, was but rarely conferred, and for some signal exploit; when, through the courage or dexterity of a general, an army reduced to the last extremity had been saved, or delivered, and the enemy put to flight.

**GRAMINEOUS HERBS**, among Latiynij, are such as have a long, narrow leaf, with no footstalk.

**GRAMINIFOLIA**, a name given by Dillenius to a genus of plants, called by Micheli and Linneus zanichellia.

**GRAMMAR** teaches the right use of language, or to speak, to read, and to write a language with propriety. Particular grammar teaches the principles peculiar to any one language. Thus the English grammar ascertains and teaches the principles which exclusively belong to, and which distinguish the English tongue. The French grammar professes the same end with regard to French; and this is the case with the grammar of any other language.

When grammar is limited to any particular language, it is employed in its humblest province, and may be considered only as a mere mechanical art, the rules of which are little investigated, and have no other foundation than the practice of those who speak and write that language. When grammar, rising above the consideration of any one language, compares many languages together, and by this comparison traces the principles which are common to them, unfolding by that means the nature and origin of speech, the causes by which it is divided into distinct dialects, and the analogies which facilitated the growth and determined the idioms of each: grammar, in this extensive view, affumes the nature of a science, and is justly distinguished by the name of general or universal grammar.

That grammar claims the dignity of a science, in consequence of investigating the general principles of speech, is evident from the slightest consideration. All languages, however different, have many properties in common. They have in general the same parts of speech, the same ideas or things which the grammar of any other language.

Men also, in all ages and countries, have the same organs of speech, which are similar in structure, however modified by peculiarities of pronunciation. Finally, the same great law of association regulates the mind of every man; and the political, moral, and religious institutions, which direct the operations of this law, however remote in age and country, considerably resemble each other. To these causes it is owing, that the languages of all nations, ancient and modern, are marked by a similitude truly surprizing; and the more closely they are examined, the more numerous will appear the points in which they all resemble each other. Hence may be justified the conclusion, that as all the tribes of men originated in one family, so all the languages of men are but ramifications of one original tongue.

Grammar has usually been divided into four departments, namely, **orthography**, **etymology**, **syntax**, and **prosody**.

Orthography teaches to form and to found letters, to analyze or combine syllables, or to express words by their proper letters. Etymology explains the character, the properties, or, more properly speaking, the derivation and composition of words. Syntax prescribes the government or the right order of words in a sentence; while prosody directs the just pronunciation, the poetical construction of words, or supplies the laws of verification. But this distribution of the parts of grammar is neither useful nor accurate, as they are not independent of each other. Etymology is a principle necessary to account for phenomena in every department, and it is that upon which orthography is chiefly founded. We therefore discard these divisions of grammar, and distilute and confine our observations on this subject.
to the origin, nature, classification, and the properties of words.

The Origin, Nature, and Classification of Words.

Words have been defined articulate or significant sounds, formed by the organs of speech, and used by common consent as signs of ideas. The propriety of this definition will appear, if we attend to the mode in which words acquire their signification. The bell method to teach a language, with which a youth is yet entirely unacquainted, would, if attended to, clearly unfold the nature and origin of speech in general. Suppose a book is held out before him for the first time, an inaccurate, pleasurable, or idea of that object is thus conveyed to his mind by the organ of sight. While this impression continues, suppose farther that the sound book is distinctly uttered; he will then have an impression or idea of the sound conveyed through the sense of hearing, which will be rendered more distinct, if he himself betakes to enunciate it. The two ideas, namely, that of the object, and that of the sound will then, if long continued, or often repeated, coalesce in his mind, and become strongly connected, that the idea of the object shall suggest that of the sound, book: and, on the other hand, the sound shall recall the object. The principle on which this coalition is founded, is a law of the human mind, known under the name association of ideas; and the progress of the learner in connecting other ideas with other sounds, is only a repetition of the operation, till the whole language is acquired.

From this brief description, naturally follow a few inferences of importance, to be observed on this subject. First, sounds, though so closely connected by frequent use with the things signified, as not to be separated from them even in imagination, have no natural affinity with them. Any other sound than book, sound for instance, might have been associated with that object, in the mind of a learner, and this last sound would as naturally, if by use, he applied to books, as we now apply it to the object so known in the sky. And this is the reason why the same idea is expressed by different sounds in different countries, where each sound is rendered equally natural and familiar by repeated associations. Secondly, as language altogether depends on an arbitrary compact between sound and sense, there exist not, in any regular polished tongue, such words as natural articulate sounds. There are, indeed, in all languages, certain sounds indicating desire or aversion, pleasure or pain, but these are natural cries, and not articulate sounds; and they arise more from the structure of man as an animal, than from his rank as an intelligent being, capable of forming distinct ideas, and expressing them by articulate sounds. Hence such sounds are common to him with inferior animals, and abound most among men in the savage state, where language is least formed. The above explanation farther excludes what have been called fictitious words, or words whose sound bears some resemblance to the sense. Some words indeed, of this kind, are supposed to exist in all languages; but the supposition, we venture to affirm, is erroneous, the imagined similarity being altogether the effect of association. This principle, when a word is heard, instantly fuggeits its meaning, and while we overlook the suggestion, we ascribe the sense to a fancied similitude between it and the sound. Let an idea be in your mind, when you hear a cock crow, or a bell toll, and you will immediately ascribe, that the sound of the cock, or of the bell, conveyed the entertained idea. This is a delusion precisely similar to that into which we fall respecting the import of fictitious words. If there be any word in our language, or in any language naturally indicative of the sense, it is cuckoo; and yet ask a foreigner, altogether unacquainted with English, what the term means, and he will not by any means be able, from the sound, to ascertain the object signified. The word is a repetition of cōc cōc, which exists in Greek under the form of ἔκος, and which in Persian signifies the sound made by a strong emission of the breath. Hence the Persian expressed the cock-kind by cōc, which we have borrowed and confined to the female cōv, which originally meant a lowing animal. In Chaldee, cuckoo means a magpie, the sound of whose voice is very different from that of the cuckoo. We cannot help remarking, that if a similitude between sound and sense obtained in any part of language, it would appear more manifest and predominant in the most ancient languages, and especially in Hebrew, which we conceive by far the most ancient, even of the Asiatic tongues. But we venture to affirm, that not a single influence of the kind can be produced in that tongue. And this early specimen of human language is a fair presumption, that the principle of fictitious sounds did not in the least obtain in the first formation of speech.

From the above explanation we infer, in the third place, that the names of things, at first, were names of individual objects, and that man learnt in youth, to form general ideas, solely by means of language. Thus with respect to the above-mentioned youth, when he has connected the sound book with the thing so called, the word is only a sign of the individual book which was first presented to him. Presently, however, he perceives the same sound applied successively to other objects of the same kind; and this application leads, and in a manner compels him to note those peculiar circumstances which distinguish each book, and these, on the other hand, which belong to that whole class of objects. As the sound is not repeatedly associated with the form, be forgets, and consequently overlooks them; while he combines the ideas belonging to the class, and retains them in a closer and yet closer union, under the term which was his instrument in forming those ideas. In this manner are all our abstract ideas acquired; and language, as the mind rises by means of it, from the contemplation of one to many objects, from individuals to classes, is the sole instrument in acquiring them. Some indissoluble idea of this process was probably the circumstance which led our celebrated grammarian, Mr. H. T. Tocke, to say, (vol. i. p. 36.) "That the composition of ideas was merely a contrivance of language; that the only composition was in the terms, and that they are not ideas, but merely terms which are general and abstract." In another place, he denies the operations of the mind as influencing speech, and talks of the operation of language. These, and such other remarks are, however, so palpably erroneous, that we cannot ascribe to him precision or attention in so enlightened a critic, but suppose them to have proceeded chiefly from a desire which pervades his works, of rejecting the ideas of others as unprofitable, because they were learned, and conspicuously displaying his own as right, because they were new. The composition of terms in grammar, is merely the derivation or combination of terms, by such laws as custom or analogy have previously determined. Composition of this kind, with which a grammarian, as such, has any thing to do, is as distinct from the composition of ideas, as sound is from sense, or grammar is from logic.

Language has no power but what it has derived from association; and he who speaks of the operation of language, instead of the operation of the mind, acts the absurd part of a man who ascribes to the pen, the motion of the hand which directs it. "If we can judge from his works," Mr. Tocke appears not to have studied the true theory of the human mind: Vol. XVI.
mind; and from the want of just ideas on this subject, he has, as we shall show in the sequel, plunged himself and his readers in deep and manifold errors.

As general or abstract ideas, which are the chief materials of science, are formed solely by the instrumenality of language, we may hence see the reason why the study of language ought to form the basis in every system of education; and why science can flourish only among a people previously acquainted with the arts of eloquence and composition. The philosophy of grammar, moreover, as it retraces the track of the human mind, in the formation of its ideas, through the medium of speech, is the key to the knowledge of its powers and operations, and consequently to their proper direction. Hence the only fyllems of metaphysics and logic, worthy the attention of a philosophical enquirer, are those which are built on the foundation of grammatical analysis.

But further, as words in the very commencement of every man's education denote individual objects, and become signs of classes or kinds by the successive application of each word to many individuals of that class, we might conclude that in the original language of mankind, if solely the effect of human invention, each term at first was but a proper name of a thing or of a quality, and afterwards represented a greater number of individuals as the mind advanced in the principle of generalization. But this inference is contrary to the fact. The Hebrew tongue carries us back almost to the infancy of human society, and, whether it be the original language of mankind or not, it presents us with much fairer specimens of what language must have been, than we can gather from any modern dialect. The primitive words of that language are founded upon the most comprehensive analogies; and the learner, in acquiring that tongue, instead of being carried up from the individual to the species, and from the species to the genus, finds himself on the top of the most extensive class; and in the formation of words he is made to descend from general to specific terms, and from specific terms to proper names; so that all the proper names which we meet with in the Hebrew records are really derived from general appellations. This phenomenon appears to us completely to annihilate the supposition, that language is solely the fruit of human ingenuity. Moses, in his history, obliquely states, and, with his usual brevity, accounts for the fact: "And out of the ground the Lord God formed every beast of the field, and every fowl of the air, and brought them to be seen what he would call them: and whatsoever Adam called every living creature, that was the name thereof." The Arabic translation, we apprehend, alone places this verse in its proper light, by rendering it so as to come to fes, i.e. to fes. The author then intimates that God showed or directed Adam in the application of names to things. And what can be more probable, than that He, who formed the organs of man, should at first instruct him in the proper use of them.

Lastly, it follows from the above explanation, that words, as they are at first associated with ideas, are in strict propriety signs of ideas, and not signs of things. For unless the idea be previously in the mind, there can be no union by association of sense with sound. The association takes place in the mind, and where the idea of the thing, and that of the sound do not meet, there can be no formation of articulate sound. The learner, however, is not capable of any distinction between his ideas and the external objects which are their origin or prototypes; and he refers the sound immediately to its prototype, without being conscious that an impression or idea of it exists in his mind. As, however, we know nothing of things but through the medium of our ideas, and as ideas must depend for their properties and distinction upon the things they represent, the above oversight is not productive of any error or inconvenience; and we may say that words are signs of things, or of the ideas of things, without any prejudice to philosophical accuracy. This leads us to the classification of speech, or its division into parts.

The common distribution in our own tongue is into nouns, articles, adjectives, pronouns, verbs, participles, adverbs, prepositions, conjunctions, and interjections. This division has obtained with little variation in other modern languages, and has been derived, on the authority of ancient grammarians, from the languages of Greece and Rome. The above classification, however general and convenient in a popular view, is by no means to be admitted in a philosophical grammar. And the few writers of this kind in English, or other tongues, have been sensible of the inaccuracy of the popular division. The Oriental grammarians admit only three parts of speech, the verb, the noun, and particles derived from these. Plato, whose notion of language as a science must have been formed in Egypt, mentions only two, the noun and the verb; tom. i. p. 261. Edit. Ser. And Aristotle mentions no more, where he treats of propositions. (De Inter. c. 2.) But Mr. Harris, Herm. p. 38, thinks that those philosophers were not ignorant of the other parts of speech, but spoke with reference to logic or dialectics, considering the essence of speech as contained in these two, because they alone combined to make a perfect affirmative sentence, which none of the rest without them are able to effect. But Aristotle, in his treatise of Poetry, where he was to lay down the elements of a more variegated speech, adds the article and conjunction to the noun and verb. The latter Stoics, improving on the authority of Aristotle, instead of four parts, made five, by dividing the noun into the appositive and proper. Others increased the number, by detaching the pronoun from the noun: the participle and adverb from the verb; and the preposition from the conjunction. The Latin grammarians went farther, and detached the interjection from the adverb, within which by the Greeks it was always included as a species.

Mr. Harris, following Aristotle and the elder Stoics, divides speech into words that are significant as principals, and those which are significant as accessories, including under the former clafs substantives and attributives, and under the latter definitives and connectives. This distribution is set aside and ridiculed by Mr. Tooke, who says, vol. i. p. 47; "In English, and in all languages, there are only two sorts of words, which are necessary for the communication of our thoughts, and they are noun and verb. And as to the parts of speech, they may be either two or twenty, or more. In the strict sense of the term, both the necessary words and the abbreviations are all of them parts of speech; because they are all useful in language, and each has a different manner of signification. But I think it of great consequence, both to knowledge and to languages, to keep the words employed for the different purposes of speech as distinct as possible. And therefore I am inclined to allow that rank only to necessary words: and to include all the others, which are not necessary to speech, but merely substantives of the first sort, under the title of abbreviations." In this hoastened division, as we shall presently see, there is neither utility nor accuracy, and the author was betrayed to it by a secret with to place the novelty of his own system in the most conspicuous light, namely, that conjunctions and prepositions are but abbreviations of nouns and verbs.

Now it is singular, that the division which we think the most philosophical, and, therefore, the most simple and useful, is that which is thus preferred in a very labouring treatise
tgatifie on grammar, in the Encyclopedia Britannica, (article 11.) "The division of words into those which are significant of themselves, and those which are significant by relation, is absolute nonsense, and has been productive of much error and mystery in some of the most celebrated treatises on grammar. It is indeed probable, that any attempt to establish a different classification of the parts of speech, from that which is commonly received, will be found of little utility, either in practice or in speculation. As far as the former is concerned, the vulgar division seems sufficiently commodious; for every man who knows anything, knows when he utters a noun, and when a verb. With respect to the latter, not to mention that all the grammarians, from Aristotle to Horne Tooke, have differed on the subject; it should seem to be of more importance, after having ascertained, with precision, the nature of each species of words, to determine in what circumstances they differ than in what they agree."

If these remarks be just, any attempt at a philosophical arrangement of the parts of language must be frivolous and useless. But we regard the paragraph as a manifest acknowledgment that the writer knew of no such arrangement, and that, as is often the case, he endeavours to confound himself and his readers, under the absence of this knowledge, with the consideration that if attained it would not be useful. We shall, however, attempt briefly to do what he thinks unnecessary to be done: but what we think not only useful and necessary, but even essential, in a philosophical treatise. An accurate distribution of our words, is but an accurate distribution of our ideas; and as in logic we cannot think juxta, unless we know how to distinguish our thoughts; so we cannot with precision reason in grammar, unless we have previously distinguished the parts of speech. The source of this distinction must be sought in the nature of the ideas expressed by those parts, and the enquiry, how many sorts of words there exist in human language, is merely, when directed to its proper object, how many sorts of ideas there are in human knowledge.

We have then ideas of things: we have ideas of the properties or attributes of things: we have ideas of the connection of things, i. e. of the arrangement of things, or of their increase or diminution; finally, we have ideas of the relation of things. Nor have we an idea which may not rank with one of these classes. And as language consists of terms expressing ideas, it consists of terms which express either ideas of things or the attributes of things, or the connection of things, or the relation of things. The terms expressing things are nouns, including substantives and the personal pronouns, which are only attributes for nouns, and therefore, in their nature, names of things. A sweet is an attribute of sugar, and so is to think an attribute of a man; to fly of a bird; to be of a being that exists, and so, moreover, loving, hating, are attributes of some creatures susceptible of love and hatred; finally, the circumstances which define things or distinguish them from others, may be considered as attributes or properties of the things so defined. The terms expressing attributes may be called attributes; and include adjectives, verbs, adverbs, participles, and definitives. The terms expressing the relations of things are propositions; while those which express the connection of things are conjunctions. And thus the most comprehensive, and, as we conceive, the most philosophical division of speech is into four parts, nouns, attributes, propositions, and conjunctions or connectives; nor is there any language, however few or numerous its terms may be, which is not capable of being distributed into these four classes. As to the interjection, it must be regarded as a sound which is either inarticulate, or which, as far as it partakes of articulation, partakes of the nature of a noun or of a verb. Having noted this distribution, we, as not prefixedly attempting to write a grammar, shall, in our remarks, follow the popular division.

Nouns and attributives, to use Mr. Harris’s language, are significant of principals, and we do not depart from philosophical accuracy, when we say that prepositions and connectives are significant by relation. Our notions of the relations and connections of things are by the principle of abstraction from our notions of the things themselves so related or connected. If all ideas of things or actions were obliterated from our minds, the ideas of their associated relations would be entirely obliterated with them. And as our notions of relation spring from the objects so related, so language, following the rite and order of ideas, has derived those terms which express relations and connections, from the terms expressing the things and operations so related and connected. In other words, prepositions and conjunctions are words which, by association, flowed from nouns and verbs as their real sources. If this be so, we shall see what Mr. H. Tooke, who assigns prepositions, conjunctions, and other particles, to be substitutes for those necessary words, the noun and verb. If this affection be put in clear language, it means that the relations of things, or of the operations of things, are substitutes for the things so related; that is, the relation of cause and effect is a substitute for cause and effect; the relation of beginning is a substitute for things which begin; the relation of instrumental is a substitute for that which is instrumental; and the relation of end is a substitute for that which ends. Moreover, the separation or concatenation of two or more affections is a substitute for the operations so separated or connected. This is not philosophical reasoning, calculated to throw light on language, but a sophistry calculated to confound the most distinct ideas which the human mind is capable of forming, and a jargon not to be equalled by any error or contradiction, which Mr. Tooke has so feverely censured and ridiculed in Mr. Harris. Besides, terms to express the relations and connections of things are not less necessary than those which denote things and their operations. A language without conjunctions and prepositions is not merely a fledge, (to use his own words,) which cannot be drawn along as smoothly, and easily, and swiftly, as a carriage with wheels, but is a fledge which has nothing to connect it with the horse; nothing to direct it in the way along which it should be drawn. The noun and the verb indeed may express a complete proposition; but the inferences in which such simple propositions occur are very few, compared with those more complicated cases where the use of prepositions and connectives is absolutely necessary. The distribution of speech into necessary words and abbreviations, is therefore, in this point of view, also frivolous and erroneous.

The Origin and Properties of Nouns.

Nouns are the names of things, or signs of those ideas by which we come to the knowledge of things. The term is a corruption of nomon, which is from nomos, while name came probably from the Perisan nām, which seems to be of the same origin with the Greek word. Nouns may be divided into three classes: names of individuals, names of species or kinds, names of abstract ideas. To this may be added, as a fourth class, the pronoun, which is made the substitutive or representative of all other nouns. But we shall consider this in the place usually alligned to it by grammarians. On each of the above classes we beg to make a few brief remarks.
Names of individuals do not enter into the composition of language; because individual objects are too numerous to have each a distinct name; and because language would then be changing in endless succession, each term dying away with the object it signified, and another rising to occupy its place. This is the reason why proper names cannot be translated from one tongue to another, the individuals specified by them, being confined to one time and one place, are not capable of being the prototypes of words in other times and places. Individuals, however, among men, animals, and places, which the purposes of life render it necessary to specify, have appropriate names given to them to distinguish them from all other individuals. And it sometimes happens that when individuals among men become eminent for any attainment or profession, their names are used to designate others who are eminent in the same way. Thus proper names are sometimes converted into common names. The former are called proper, as being peculiar to individuals, in opposition to such names as are common to all the individuals of a class.

The perceptions of the human mind, as we have observed, commence with individual objects: but we were soon induced to compare those objects; and on comparing individuals together, we readily discern a resemblance between them in some things while they differ in others. The mind then separates the particulars in which objects differ, and collects into one idea their points of similarity. Thus it forms ideas of classes, or in logic called species, comprehending under them various individuals. After this the species themselves soon become subjects of comparison; and excluding from each its individual qualities, the human mind formed those more general aggregates termed kinds, comprehending under them different species, as the species comprehend different individuals. Thus mankind classified all the objects around them, and acquired specific and generic ideas in nature, in art, and in abstract qualities. Having, as it is supposed, first advanced in the classification of their ideas, men gave names to each class, and thus acquired those general terms which are called specific and generic terms. But we have already shown that the processes of the human mind, in the principle of abstraction, is the reverse of this: general terms do not arise, as will appear evident if we attend to the commencement of education in ourselves and others, from general ideas, but, on the contrary, general ideas arise from general terms. The former have no existence till they are generated in the mind solely by the instrumentality of language: the learner being involuntarily and per- fectly led by the successive application of the same word to different individuals of the same class, to compare them, to separate their component parts where they differ, and to combine them where they agree. In this point of view, grammar is the foundation of logic and language, instead of being the offspring of human invention, is the sole medium of awakening the first dawn of intelligence in the human mind, and points for its existence to some intelligence superior to man.

Specific and generic ideas being thus formed, the subject matter of language is reduced, so as to be commensurate with the limited faculties of man; because, though individual objects are infinite, the classes comprehending them are comparatively few. The subject matter of speech by this means, moreover, is rendered permanent and universal, or confined to points of space and time; because, though particular things are local and transient, the species and kinds of things are universal and eternal. This is the reason why words which are unintelligible in one age and country are understood in other ages and countries; and may be translated from one tongue into another, without ambiguity or error, where the prototypes exist in common.

Further, though general terms are often indefinite and uncertain, yet whenever they express species or kinds, they may be defined by ascertaining the several ideas which constitute those species or kinds. And as the properties which constitute each class are found complete in each individual of each class, the name of the kind is applied to each of the species; and the name of the species to each individual included under it: and thus generic and specific terms are employed by the affluence of certain adjuncts hereafter to be considered, to denote individuals.

General ideas may be considered as abstract ideas, as they are generated by the mind separating or abstracting from each object those particularities which constitute individuality. But they are to be distinguished, at least in a grammatical view, from that numerous and important class of ideas which we acquire by the more simple art of separating from a thing the quality which belongs to it. Thus, the idea of fly becomes thought; and good is converted into goods. Abstract nouns of this kind are all, without exception, derived from verbs and adjectives, and formed by the simple power of withdrawing a property from the subject which supports it, and giving it an independent existence in the imagination. Now, it is a fact worthy of attention, that as general, so abstracted, ideas are formed by the sole agency of language, and would not have existed in the slightest degree, if words had not previously been applied to express the qualities of things. For as soon as a property was marked by an appropriate word, the separate and independent existence of that word, recognized by the eye or by the ear, induced the mind, without an effort and, perhaps imperceptibly, to give the property so designated an independent existence also. Mr. Tooke rejects the principle of abstraction; and would introduce in the room of it what he calls subordination. Thus, according to him, goods is that which is good; flying is that which flies: and under this erroneous and circuitous mode of explaining abstract qualities which he has borrowed from the neuter particle in Latin, he has attempted to bury out of sight the operation of the mind in forming abstract ideas. The existence of this operation, however, is too obvious to be denied with effect, and too important, in philosophical grammar, to be abandoned on the authority of any person whose acuteness of intellect may enable him sometimes rather to perplex than to unravel truth. In conformity to his own theory, Mr. Tooke supposes such words as science, diligence, which are abstract nouns, derived from the Latin scientia, diligentia, to be neuter particles plural in enit, a supposition contrary to the analogy of the Latin tongue, which affords not a single instance of plural adjectives being converted into abstract nouns.

Grammar cannot help noticing in this place an observation in the Encyclopaedia Britannica, viz.: "All the objects which exist must be either in the same state in which they were produced by nature, or changed from their original state by art, or abstracted from substances by the powers of imagination, and conceived by the mind, as having at least the capacity of being characterized by qualities; this naturally suggests a division of nouns into natural, as man, vegetable, tree, &c.; artificial, as boat, ship, watch, &c.; and abstract, as knowledge, motion, temperature, &c. This division has been borrowed from Mr. Harris, in his Hermes, and borrowed without consideration. Abstract ideas are the chief materials of science, which, giving birth to art, extended to the productions of art, as its genuine offspring, the life of its own terms. Accordingly, all artificial terms are abstract.
G R A M M A R.

abstrat terms, or terms derived from adjectives and verbs. Thus, *fusible* denotes an artificial production, and is at the same time an abstract noun from *fusilit*; and *phlog* is taken from the Hebrew *phlog*, phlog, and means an instrument of separation. And even natural objects are often expressed by abstract nouns, as *creation* from the verb *create*. And if abstract nouns are extended by association to designate natural and artificial objects, they cannot with propriety be said to form a class of nouns distinct from nature and art.

Abstract nouns, expressing ideas properly so called, are very numerous in our language, and worthy of attention. They are chiefly taken from the Latin; as those in *ion* or *ion*, ment, cera, ty, or tude, as *faction*, collufion, commandment, confefion, piety, altitude, and all the nouns of this termination, with others in *nfe* and *t*, such as *expag* and *merit*, are also from this source. Many others are derived from the Anglo-Saxon or Gothic, such as all those in *nfe*, *foms*, and *hood*; as *goodness*, *wisdom*, *neighbourhood*. The far greater part of Mr. Tooke's second volume is occupied in tracing nouns of this description. His etymological researches are, in many respects, useful and important; but we cannot help hearing our testimony against his work, as tending to direct the labours of philological enquirers to wrong objects, and to withdraw their attention from those sources, whence English and all other European languages, ancient and modern, have sprung. But let us hear his own words: "The bulk and foundation of the Latin language is Greek; but great part of the Latin is the language of our northern ancestors granted upon the Greek. And to our northern language the etymologie must go, for that part of the Latin which the Greek will not furnish; and there, without any twitting or turning, or ridiculous forcing and torturing of words, he will easily and clearly find it. We want, therefore, the testimony of no historians to conclude that the founders of the Roman state and of the Latin tongue, came not from Asia, but from the north of Europe. For the language cannot be and from the language of every nation we may with certainty collect its origin. In the same manner, even though no history of the fact had remained; and though another Virgil, and another Dionysius, had again in verse and prose brought another *Æneas* from another Troy to settle modern Italy, after the destruction of the Roman government, yet, in spite of such false history, we should be able, from the modern language of the country, (which cannot possibly lie,) to conclude with certainty, that our northern ancestors had again made another successful irruption into Italy, and again granted their own language upon the Latin, as before upon the Greek. For all the Italian which cannot be easily thrown to be Latin, can be easily thrown to be our northern language. Mr. Wakefield had, shortly before his death, agreed with me to undertake, in conjunction, a division and separation of the Latin tongue into two parts; placing together in one division all that could be clearly thrown to be of northern extraction." (Vol. ii. p. 142.) In p. 299, he gives the following infusions, with many others, of Latin words derived from the northern language:

<table>
<thead>
<tr>
<th>Latin word</th>
<th>English root</th>
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<tbody>
<tr>
<td>Habian,</td>
<td>habere</td>
</tr>
<tr>
<td>Hucasan,</td>
<td>necare</td>
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<tr>
<td>Higan,</td>
<td>ire</td>
</tr>
<tr>
<td>Hentan,</td>
<td>hendre</td>
</tr>
<tr>
<td>Welopian,</td>
<td>woltere</td>
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<tr>
<td>Fleus,</td>
<td>fluere</td>
</tr>
<tr>
<td>Spiran,</td>
<td>spirare</td>
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<tr>
<td>Spowian,</td>
<td>spure</td>
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<tr>
<td>Spitan,</td>
<td>spure</td>
</tr>
<tr>
<td>Mildeian,</td>
<td>madere</td>
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<tr>
<td>Meogian,</td>
<td>madure</td>
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<tr>
<td>Pyongan,</td>
<td>pangerve</td>
</tr>
<tr>
<td>Tillian,</td>
<td>tender</td>
</tr>
<tr>
<td>Fegan,</td>
<td>figere</td>
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</table>

According to Mr. Tooke, the words in Roman letters are plainly of northern origin, while those corresponding to them in italics are Latin verbs derived from them. The reverse of this position we can prove to be true. The Anglo-Saxon, or Gothic words, which this author dignifies as northern primitives, are no other than Latin words borrowed and corrupted by the northern barbarians when they over-ran the Roman empire. This position, if proved, will render the far greater part of Mr. Tooke's labours perfectly nugatory; and nothing more is necessary to prove it than to shew that the origins of the Latin words exit in Greek, or in one of the Oriental tongues, and exit in such a form, as to evince that these are the primitives, and consequently that the northern words are only corruptions derived from thence. Thus the Hebrew מָלִךְ, מָלִיך, is a hand; hence *capo*, to take in hand, and by softening, *t* into an aspirate, as is often the case, *bales*, to hold in the hand, *i.e.* to have. The Greek αὐτόρ, *autó*, overthrow, is the parent of the Latin *neos*, corrupted into *neuran*; *sōs*, I ego, go, *higan*; *xērho*, bend, *hentan*, to beise; *līdis*, *volos*, *velleapion*, to roll; *ēlōn*, *flūan*, *fluere*, to flow; *μόνα*, *flōs*, and *μονα*, *fūt*, signify life; hence *fusoe*, *sifte*, the action of the lips in throwing out of the mouth, *i.e.* *sīt*, *fīs*, *φυνα*, *fυνα*, to soften, *μελος*, *melos*, *νυκτα*, *nukei*, *νυλος*, *nuilei*, *μελακα*, to milk; *νυλος*, *recompense*, *peruim*, *pīne*, *pinnam*, to punish; *πορν*, a tail, *pango*, *pygian*, to act as a tail. does, *i.e.* to prick; *πτερ*, *fīg*, *fageian*, to fix; *κολο*, *koł*, *deko*, to wash down, to oblate by washing, *diligin*; *μολος*, *molo*, *Goth. molan*, to mill; *Chald. γωνη, *goen*, *gōn*, *kōn*, *kian*, to blow; *τοκε*, *toko*, to rice, *blūan*, *ekel*, to spin, *twill*, *netis*, *gitan*, or *gnatan*; *εγος*, *ego*, *tego*, or *tango*, *tekion*, to touch; *δεκλε*, *dame*, *deman*, *δηκε*, *dīke*, to take food, *profian*; to prove; *αρετη*, *transposing r*, as is often the case, *rapio*, *rapian*, *πνων*, to defire, *pēs*, to seek in consequence of desiring, *bidaman*.  

Though this lift clearly shews that the Northern language in a great degree, a corruption of the Latin borrowed from the Greek, the Hebrew, and other Oriental tongues, yet Mr. Tooke gives it as exhibiting infusions of the Northern dialect grafted on the Latin. The primitive language of the North could have been no other than a branch of the primordial language of men, conveyed there by the first emigrants, diversified and enriched by communications with the Earl on the north of Asia, by early irruptions into Greece, as is mentioned by Herodotus, and, in far later days, by amalgating with the Latin, when in the dark ages the tribes of the North invaded and dismembered the Roman empire. In this state, the Northern language became the parent of the English; and though a multitude of its words, especially monosyllabic words, are, no doubt, immediately from the Anglo-Saxon and Gothic, yet few influences we believe, can be produced, which may not be traced, by a competent etymologist, through the medium of those corrupt changes, to their primordial purity in Italy, in Greece, and in the Earl, the sole origin of language and literature. But Mr. Tooke reverses this natural and necessary order; and, without the testimony of historians, without any documents of the language fulfilling in the North, antecedent to that, which was spoken in the middle ages, he fixes on corruptions borrowed from the Latin, and holds them up as the origin whence Latin, Greek, and English have been derived. His theory, thus far, is ridiculous and mischievous; ridiculous, because it is a palpable error, professed by important discoveries; and mischievous, because, while it pretends to trace words
words to their genuine roots, flops up all the true sources of information on the subject of language. As we have palled this cenure on his stylen, we feel ourselves called upon to justify it by more numerous instances. And we think this the more necessary, as subsequent grammarians, and the public in general, seem willing to acquiece in his positions as incontrovertibly just.

In doing this we shall adopt the words which present themselves, without much felection, referring our readers to the page where they occur in his lecond volume. It was impossible to err as to the derivation of right from rectum; but something ordered is not the leading idea of the term, though Mr. Tooke employs many quarto pages in explaining it on this principle. The primary sense of right is straight, a relative term, denoting the means to an end. Thus, virtus is right, because it is the straight or direct road to happiness. That hand is right, which does its work in the foremost way. Property is right, because it is the straight road to the welfare of society. In this sense we may say of God, if we say it with reverence, that it is right in him, because, when he has an end to answer, right means the straight way to accomplish it. "The left-hand is that which is loved, or that which we are taught to leave out of use on such occasion," p. 10. This appears to us nonsense. Left is the Greek λεφτος, and Latin levus, with r, the usual termination of northern words. Lex, Fr. lai, and our law, is from lege, and means something read or dictated, and not something placed, p. 8. The Anglo-Saxon, legan, puer, is but a corruption of locare, to place. Juvius, indeed, means something commanded, jujrum, from juvo. But this last is the Hebrew ו'ג, gab, and the Arabic jahb, to answer or assert. Hence, in Latin, jubere legem, to enact a law, i.e. to allow to pass, and promise to obey it.

"To enact is to do as the cuckow does," p. 21. Few people know how the cuckow does; but all know how a cock acts on such occasions. Kokora is an Eastern word, which, coming into Italy, gave birth to civus, to crow; and, changing r into the commate l, as is often the case, to kokola, which, in Celtic, is klok and kilgée, to act as a cock does with a hen. This, we presume, is the origin of cuckold. Hen-pecked is a figure of the same nature, and from the same source. "Alert is all-ecret," p. 24. No, we presume it is all-ert, or all-art, i.e. all active. The word art, signifying skill, came to signify that diligence by which skill is attained. The opposite, which functions this etymology, is inerti, not active. A knave, i.e. a man cunningly skilful, came, by the fame allocation, from gnawus, diligent.

"Left, (French lache) of a whip, i.e. that part of it which is hi tope," p. 32. Rather from lapes, an offer. The French laches, or the Italian lascie, is the Latin lascare, from lapes, to bend. To bend, or to burn, gave birth to branch, i.e. a mark by burning—brand, i.e. spirits which burn—bruxon, i.e. bread burnt—brunt, brunt of the battle, i.e. the heat of the battle, or the place where the battle burns. The origin is furunc, an even. Odd is not the particle oved, i.e. something owed to make up a pair, p. 88; but the Hebrew יאשע, abad, one, single, singular, i.e. one that has no other to make an even number, or pair, with him. Thus we say, an odd man, i.e. a singular man. loud, p. 39, is, we presume, from όλος, a voice heard. The Anglo-Saxon, derived from this word, has preferred the s aspirated, blawen. In Celtic it is cladd, that which is heard in pratie of a man. The Latin has rejected the gutturall altogether in laudo. The Greek poets have applied the epithet όλος to such animals as beet; hence lau: stred, or stred, four, four, (as plough share) p. 41, come from lapes, to clap, by prefixing s, a practice very frequent in Latin; and hence the Anglo-Saxon stredan, to flcer.

One of these broad analogies by which the Latin separated from the Greek, is to convert a gutturall into a labial, as in ολος, flat, όλος, flourish. Thus it may be, culs became, as it were, fuls, flat, field, i.e. a cultivated ground, and not a place filled, p. 41. Coward is the participle of corner, to bend; but the parent of this verb is корн, to shrink, p. 42. Bread is bearing, i.e. the produce of the earth, as bread, offspring, is born, something born, and not from the obsolete bray, to pound, which is taken from the Latin frico or frango; both of which originated in the Arabic jοł, jολ. Freed, free, is the participial termination of jολ, or jολ, violence, in which, as Socrates says, there is emity; while friend is the same form of fraye, a woman, (from φραγι, i.e. the bearine animal,) by which we mean a female hewe. The letter l, being of the fame organs with n, is often changed for it in all languages, as ονκος, lympha; ρος, pubu. On the fame principle, the Hebrew ו, to marry, became lαf, or love. The Hebrew ו, and the Persian knob, felf, passing to the North, gave birth to the pronoun, or, as it is farther corrupted, it, which, like id in Latin, directs the attention to something going before, and is a substitute for it. Gothic haitan, Anglo-Saxon hetan, or getan, to speak or command, is, perhaps, the Greek φανα, which, in Grecian, is seynd, in English quoth, and in Latin in the compound form of in-qui, p. 53.

Tight, i.e. tied, and the Gothic tjian, is from ολος, to fold up, 67. Twill is tortus or tufus, and not that which is twisted. Quilt is called, (ωλος) twisted. Draught, drag, is τρομος, trudo. Tilt is tilted, lifted, from τάλα, tale. "Barren, i.e. barren, cloed, shut," p. 72. The verbs φρευ, φρευ, bare, bare, bare, bare, bare, with the numerous tribes of words derived from these in all languages, owe their existence to the Arabic barren, the earth, or that which produces all things; and barren, we presume, meant primarily an animal having produced; and thence it denoted infertility, consequent on production, or, more generally, incapacity to produce. The Hebrew ו, sier, denotes any thing close, sibor, or hard. Hence the Greek φευ, firm, rigid; and our firm, p. 73. The same word in Arabic means a harh or acute found, and hence seemingly the English fir. The Arabic ו, seer, which we should pronounce sier, denotes to flow, or to move as water does. Hence the Anglo-Saxon sieran, which means to cause a ship to move, which is the meaning of the hence-derived sier. Stern is that part of a ship which is thus moved. The Hebrew יאש, gur, to turn, has given birth to turn, turning or stirring cream being the means of obtaining butter, which in Anglo-Saxon is grean, to yeare, which is a revolution of time; to surn, which means therefore something turned or twilled, and not prepared. Homer, pilus, means hair on the head; hence it signified to form hair, or to grow into a head. And this is the origin of our words pile, build. Bold or built originated in validus, bodily strength naturally infusing mental energy; 79; but bolus, p. 128, is βόλος or βόλος, the thing cast, 129. Bore is the Hebrew יאשע, bacer, a sturdy rapid animal; but bresau we think is not barren, but park, parken, proven, brawn, from porcine, and therefore it means the flesh of a pig, 87.

Chop, chip, is something cut off, from κοτ, κοτ, the Anglo-Saxon pibtan, to pledge, is from κοτ or κοτ, to strike, plight being a bargain struck. Shunt is the fame in sense and found with the Arabic ינש, find. The Anglo-Saxon fætan is nothing but the Hebrew ינש, flit, notes; and hence it came to signify the action of the nates in throwing away the excrements. We shall merely add the following list, and all the words...
words in the labourd chapter on **abstraction** are, with few exceptions, capable of being traced in the same manner; and we defer our readers to compare the derivations here given with those of Mr. Tooke in the above mentioned to.

*Grammar*.

*Oracles*, to divulge or expose; *trull*, a public woman, p. 153.

_Tuis_, to turn, drab, a woman that turns about, a vagabond woman, 154: hence the Gothic *frilian*, to drive about, or turn out, 155. The Arabic ُعُلِّ, *alb*, means food, support, and hence *baws*, the means of subsistence. The Anglo-Saxon has preferred the nasal aspirate *blaf*, 157. From *aws*, a bill, came the Anglo-Saxon *byfian*, to rise to a high place; hence *tysi*, life, 152. ُتُهُّ, *rham*, Anglo-Saxon krye, vircere, green. ُتُهُّ, *Anglo-Saxon gerygan*, to decay. Grey, 167, the colour of old age. ُتُهُّ, *blaf*, flower. ُتُهُّ, *bahr*, fluidity. *Suir*, fire, fr. *Koga*, a wrinkle. Rough, Anglo-Saxon *ryf*, 177. ُتُهُّ, *woos*, word. Anglo-Saxon *swan*, 176. *Tows*, to arrange, bind, command; hence *teo*, to weare; *hos*, tribute, *i.e.*, tags, the thing felled, 179. *Tows*, to rule; hence *teles*, tall, i.e., what is raised. ُتُهُّ, *figi*, also to command, and hence it came to denote voice, or found in general *toll*, *tale*, *tall*, the found of a bell. 184, a tribute, *tita*, to pay, *tall*. ُتُهُّ, to slay, to tall, or, as it was formerly speelt, *tall*, 185; *teo*, to slay, *tall*, to slay the medium of toll, an instrument. Hence, moreover, Anglo-Saxon *thiuluin*, till, i.e., to slay on the ground, cultivate the ground, 182. ُتُهُّ, *bur*, something added on the outside for the sake of defence, is the origin of bar: ُتُهُّ, ُتُهُّ, *burich*, is bargh, borough, a place barred, *i.e.*, secured, which in Greek is *teyos*, a tower, and in English *park*; moreover, the bark of a tree is ُتُهُّ, *birk*, or that which separates from the tree. The Arabic *barbain*, a nobleman, is the parent of baron, and to this sense of the word St. Paul alludes, in *Acts*, xvii. "*THEBAN* were more noble than those of Thessalonica." ُتُهُّ, *phlak*, in Arabic means a *flap*, and this, by changing *l* into *r*, gave birth to *bark* and *large*, 182. ُتُهُّ, *bur*, pit or grave, *bary*. ُتُهُّ, *flora*, flower, treasure, 185. ُتُهُّ, *flora*, to inundate, is the Anglo-Saxon *furmian*, to rage as a flood, and hence *flora*, 183. ُتُهُّ, *flora*, in Arabic means a body of people come together; hence *town*, 201. ُتُهُّ, *beet*, means a house, a place that holds or contains; hence, bed, abode, pot, in Greek *paxos*, in Celtic *bed*, the lit abode of man, and pit. *Cruft*, to plead, to deliberate, gave birth to choices, the effect of deliberation, and to savem, i.e., to deceive by pleading. The *Persian pdrab*, is vine, juice; and hence the Latin *virgo*, and the English *frap*, 209. ُتُهُّ, *baran*, morrow, Anglo-Saxon *merna*, man. *Traps*, to heat, to dry, to evaporate by heat; hence Anglo-Saxon *drygan*, drain, 224. *Tros*, a garment, rag, *rig*. *Tenes*, trall, Anglo-Saxon *draggen*, dragon, drone, an insect that drags itself. ُتُهُّ, *shod*, produced. *Zill*, Anglo-Saxon *flidan*, to separate, seems to have come from *xalos*, *ig*, i.e., to put the legs in action, to separate one from the other.


These specimens (and they are ample specimens) will be sufficient to enable us to form a full estimate of Mr. Tooke's merit as an etymologist. If the above are well founded, they show that his labours have been greatly over-rated. His great error is, that by forced analogies, or rather contrary to all analogy, he has yoked together words as of a common origin, which have flowed from very different sources; and this error has arisen from his studied inattention to the operations of the human mind, to a still greater want of acquaintance with the Oriental tongues, whence all the European dialects, ancient and modern, have been derived; and to his prepositional attempt to deduce English, Latin, and Greek, from the corruptions of Latin and Greek by a barbarous people in the dark ages. Before we quit this subject, we shall make one or two observations worthy the attention of those who trace the ramifications of modern languages from their ancient roots.

In the Oriental tongues gutturals abounded, which, like other consonants, contained in themselves the vowels necofos, to their pronunciation. But it is the tendency of every guttural, when become habitual, to soften down, in the rubbish of utterance, into a mere aspirate, till it at length vanishes. Thus *causa* has degenerated into *caos*, and *xalmaux* into *hams*, and into *homos*, a creature of earth; in the Greek, the Oriental *Homos*, a king, became *xanatos*, to reign, which Homer pronounced *xanatos*. This principle has obtained in the formation of many words, derived into English through the medium of the Anglo-Saxon and the Gothic. And the inflections are still more numerous where the aspirate, instead of vanishing, has been converted into the labials *v*, *f*, or *y*. Thus *wicked* is the Arabic ُتُهُّ, *begnud*, *sworn*, the *Perian gorn*, *all*, *sos*, *sapolis*, the Hebrew *wuy*, *kab*, work, *sos*, the Chaldean ُتُهُّ, *dark*, *cheil*, *strength*, hence *xwad*, *wealth*, the strength of a filet; *xwaol*, the strength of a town; *xuliel*, health, the strength of the human body. ُتُهُّ, *hart*, write.

An intimation to this principle has betrayed Mr. Tooke into many errors; thus he derives *feld* from *felded*, that is, a piece of ground in which the wood is felled; whereas we conceive it is a corruption of *culus*; as if *fulbus*, *fuli*, field, i.e., a cultivated piece of ground, precisely in the same way as *xalma*, became *xer*, and *xalmaux*, felt, fall. This substitution of the labials for aspirate or aspirate obtained in an early period of the Greek, and constitutes the original of what is called the *digamma*. This digamma prevailed in the age of Homer, when the language was chiefly oral. But his poems, as being written, preferred the guttural or aspirate, the true original character, which being studied, enabled the aspirate to prevail in time over the digamma; and thus it reflored the language to its primitive purity. But the Latin, having flowed from the Greek at an early age, when the caprice of oral sounds spread uncontrolled by written letters, and having no monument of genius like the *Hind* and *Odyssey* to correct that caprice, as was the case in Greece, adopted the digamma, and thus separated, by a broad line of distinction, from the parent tongue. We now return to the properties of nouns.

The properties of nouns are gender, number, and case. Gender, as meaning the distinction of sex, was by no means a necessary property of nouns, for the signification was sufficient to show the sex to which it belonged. Thus, as there
there were but two sexes, there should have been two genders, masculine and feminine, nouns meaning males being ranked under the former class, those meaning females under the latter; while the neuter or neither gender comprehended the names of inanimate things, or such animals as had their sex not discernible, or not necessary to be distinguished. But unfortunately the termination of nouns became a mark of gender independent of their signification; and thus nouns were considered as masculine, feminine, or neuter, as they happened to have the endings which custom usually affixed to either of the three classes. The Hebrew tongue, in its primitive purity, appears to have been exempt from this unhappy embarrassment, and the only languages known to us which have maintained the empire of common sense against the caprice of custom are the English, the Persian, and the Bengalic. In Greek and Latin the dictates of reason have so far prevailed as to cause all those nouns, whatever be their terminations, which mean males and females, to be deemed masculine and feminine; while the names of inanimate objects only are determined by the termination. In other languages, such as the Arabic, French, and Italian, this absurdity has been carried much farther, the names of inanimate objects being said to have gender: the neuter, which is only the negative of sex, is excluded; and the learner has his memory loaded with the gender of nouns which really meant things without sex, and this without any one advantage to counterbalance so much fruitless trouble, and such glaring facric of common sense.

The English language, as conforming to nature in regard to the distinctions of gender, has greatly the advantage over other tongues: when rising to the rhetorical and poetical style it addresses the fancy by periphrasis. This figure is essential to poetry. In order to interfile the imagination, the subject of discourse, when inanimate, must be invested with the forms and attributes of living beings. Now, when things are thus periphrased or spoken of as persons, they must be represented as male or female. May they be made either? Or is there any analogy to give one the preference over the other? Let us hear what Mr. Harris (Herm. p. 44.) says on this subject. Having observed that some nouns are of such a gender from having such a termination, he thus proceeds: "In others we may imagine a more subtle kind of reasoning, a reasoning which discerns even in things without sex a dildant analogy to that great natural distinction which, according to Milton, animates the world. In this view we may conceive those substantives to have been considered as masculine, which were conspicuous for the attributes of imparting or communicating, or which were by nature active, strong, and efficacious, and that indifferently whether to good or to ill, or which had claim to eminence either laudable or otherwise. The feminine, on the contrary, were such as were conspicuous for the attributes either of receiving, of containing, or of producing and bringing forth; or which had more of the passive in their nature than of the active; or which were peculiarly beautiful and amiable; or which had respect to such exceedingly as were rather feminine than masculine." On this principle the sun, as imparting light, is masculine; the moon, as receiving it, feminine. The sky, or ether, time, death, the ocean, the Supreme Being are all masculine; while the earth, sky, city, virtue, religion, are feminine. And yet Mr. Tooke roundly pronounces this reasoning fallacious. "As for Mr. Harris's poetical authorities, the Mufs are bitter bad judges in matters of philosophy. Besides, that Reason is an arrant depôt, who, in his own dominions, admits of no authority but his own. And he is particularly unfortunate in the very outset: for his very first instances, the sun and the moon, destroy the whole subtility of this kind of reasoning. For Mr. Harris ought to have known that in many Asiatic languages, and in all the northern languages of this part of the globe which we inhabit, and particularly in our mother language, the Anglo-Saxon, sun is feminine, and moon is masculine," vol. i. p. 54. The author of the learned treatise on grammar in the Encyclop. Britannica, 17, relining no doubt on the authority of Mr. Tooke, thus pronounces on the reasoning of Mr. Harris: "Such speculations are wholly fanciful: and the principle on which they proceed are overturned by an appeal to facts. Many of the substantives which in one language have masculine names, have in others names that are feminine, which could not be the case, were this matter regulated by reason or nature."

The languages from which the objection to Mr. Harris's theory is derived are not regulated in regard to the distinction of gender by reason or nature. And facts borrowed from them are not fully to be admitted as conclusive against a principle in a language which is regulated by reason and nature. Mr. Harris deduced his theory from the English, though he has applied it with perhaps more fancy than truth to some instances in the classical languages. Our own tongue, as making all things neuter which have no life, admits the operation of fancy in perceiving inanimate objects; and where periphrasis is admitted, the analogy to the natural distinction of the sexes must necessarily be admitted also.

But, Mr. Tooke and his abettor say, it is fanciful because it does not obtain in other tongues. Their argument is briefly this:—The sun, by periphrasis, is not made masculine in English, where the consideration of gender is founded on reason, because it is made feminine in some languages where the termination, and not reason, determines the gender. Reaoning of this kind is not only inconclusive, but frivolous; and the analogy stated by Mr. Harris invariably and necessarily operates on our own tongue, and would have operated in all tongues, if, like the English, they had conformed to the standard of nature; and we ought no more from their caprice to argue against the dictates of reason and analogy, than we ought to deny a regard to the distinction of sex in the nouns of one language, because the gender of the same nouns in others is regulated by considerations independent of sex.

When a noun represents its object as one, it is said to be in the singular, and plural when meaning more than one. This property also can hardly be said to be necessary to nouns, as its place might have been supplied with greater accuracy by numerical adjectives when extended to express numbers, as two men, three men, &c. "Bengal nouns," says Mr. Halhed, in his excellent grammar of that tongue, p. 68. "have neither dual nor plural numbers, I may add that neither is wanted. The dual is found in no modern language, and probably never existed but in the Arabic and its branches, in the Shanferi and in the Greek. That the idea of multitude is not confined to the plural number, is clear beyond a doubt, because singular nouns are used in all languages with a collective sense, almost as frequently as plurals, thus: man love to fludy, and man loves to fludy, are phrases perfectly equivalent. So also we join to a noun in the singular number an epithet of indefinite plurality to convey a plural meaning: many a man is written by the Bengalic authors manbooy. Perhaps it might be safely urged that the singular number has more occasion for an accurate specification than the plural; at least this is the only circumstance which can account for the extensive use of the article or representative of unity in most of the modern dialects of Europe."

The plural number in its origin was no other than a noun-
of multitude, annexed to that preceding it, in order to mark its extension from one to many. Thus in Hebrew, 'whence high antiquity unfolds to the philosophical enquirer the several steps which mankind took in the formation of speech: יִשָּׁר מֶלַךְ, an ephah, a man, multitude, became contracted, for the sake of brevity, into יִשָּׁר מַלֶּא, an- 
some, men. In the Chaldean and Syriac the final _n_ was 
changed into _n_. Hence the Hebrew _n_ in Chaldean bec- 
came _m_ in Arabic _m_ in Persian _man_, to denote the names of 
animals, and _n_ inanimate things. And from this source 
are derived the plural terminations _m_ or _m_ in the Anglo-
Saxon and German tongues. The letters _n_ and _a_ being 
of the same origin, the Chaldean _n_ became _a_ in the formation 
of the Greek, or _a_ in the third declension of Latin nouns. 
Hence, too, the plural termination _s_ in English and French, 
while the Italian exclusively follows the analogy of the second 
Latin declension in _s_. Thus the plural termination in all lan-
guages, ancient and modern, appears to have been derived 
from one source: and that consisted of the annexation of a 
_n_ of multitude to the singular form of a preceding noun.

And it is remarkable that in the Bengalese, which is but 
a branch of the Sanscrit, this mode of expressing plural nouns 
is preferred to this day; as, _pure_ch, a peafant, _pure_h, a 
peafant-people, _pure_bak, peafants; _bak_ signifying people annexed 
to the singular noun whatever it might be. We shall only 
observe, that the names of clafhes only admit the plural form; 
while _proper_ names in all languages are, by their _nification_
confined to the singular, unless many individuals by accident 
have the same name. The names of _families_ and _nations_ must 
likewise be excepted, which, from a regard to their _nification_
are necessarily _plural_.

We come next to the consideration of _cafe_, which are 
properties of nouns, perplexed and undefined, as is evident 
from the different, and we may add, erroneous accounts 
given of them by most grammarians. The belt and 
luret way to aecertain the nature and origin of _cafe_, is to 
attend to the manner in which they were at first considered 
in the Peripatetic school. We adopt the words of Mr. 
Harris, p. 277. "The Peripatetics held the nominative to be 
no _cafe_, and likened the _n_ of this, its primary and original 
form, to a perpendicular line, such for example as the line

[Diagram of a perpendicular line with points A, B, C, D, and a right angle at C.

A B. The variations from the nominative, they considered 
as if A B were to fall from its perpendicular, as for example 
to A C or A D. Hence, they only considered the variations 
_παράσημος, κατάσκευα_ for _παράσημον, κατάσκευα_ for _παράσημον, κατάσκευα_ for _παράσημον, κατά
sκευα_ for _παράσημον, κατάσκευα_ for _παράσημον, κατάσκευα_ for _παράσημον, κατάσκευα_ for _πα
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We copy this account because it is very plausible, though 
we regard it as erroneous; the learned author and Ammonius 
(De Interpret. p. 335) from whom he derived it, being 
misled by the figurative language borrowed from geometry. 
We believe that the nominative is said to be in the right 
cafe, not because it is an erect or upright falling from the mind,
but because the nominative, the verb, and its object following 
each other in direct succession, form one simple proposition. 
The nominative is the leading noun or _agent_, and the accusive 
is the _effect_, in which the action straightforward terminates. 
And when other nouns are introduced, they are spoken of not 
directly as the agent or subject, but collaterally or obliquely,
as objects to which the direct noun someway belongs. Thus 
the accusive as well as the nominative are right cafes, or _di-
erent parts of a proposition_; whereas the _cafe_, _dative_, ablative,
and vocative are oblique cafes, or _indirect parts of a propo-

tion_.

From this simple statement, which we recommend to our 
readers as important, we infer, that a _cafe_ did not at first 
mean a _change_ in the termination of a noun, but the _position_ 
of a _cafe_ expressing its relation to some other word in 
the sentence. And our next object is to ascertain those _leading 
relations_ which the _position_ of a _cafe_ and _cafe_ other means 
more specific, expresses. _God made man_ is a sentence in 
which the _agent_, the _action_, and the _object_ follow each 
other in the _order of nature_: _God_, as occupying the place 
of the _agent_, is the nominative; and _man_, as _correspond-
ing_ to the _cause_, is the _accusative_. But in the _sentence_

"God is good," we cannot say _God_ is the _agent_, because 
the verb _is_ does not express an _action_, but serves only to 
connect the _epithet_ with _God_. The nominative, therefore, here 
expresses not the _agent_, but the _subject_ of the attribute 
connected to it. The nominative _cafe_, then, is that leading 
_thing_ or _position_ which expresses the _subject_ of a _connecting_ 
verb. And the _accusative_ is that _position_ which expresses the _effect_ of an _active_ _verb_, and thus _one simple 
position_ will carry us: and the nominative and _accusative_ have evidently to each other the _relationship_ which 
a _cafe_ has to its _effect_, and that for no other reason, but that 
their _order_ corresponds to the _order_ of _cause_ and _effect_.

But suppose that my _purpose_ was not only to express 
a _cafe_ or _agent_, but the _origin_ of that _cafe_, or the _infr-_ 
ment by which it acts, or the _end_ for which it acts. In such cafes 
one _position_ will be of no avail. I must have recourse 
to some other expedient, and no expedient so well can serve as 
_futile_ words to express _origin_, _inframentality_, and _end_. 
Thus, the _Son of God_ redeemed mankind—he redeemed them 
by _his death_; he redeemed them for _happiness_. In the 
first sentence, _of means_ beginning or _origin_; and _God_, 
successing _it_, is the _subject_ of _God_, is _said_ to be in the _na-
ative_ _cafe_. In the _second_, _is means_ _inframentality_, or _medi-
ium_; and _as death_ is _the medium_ or _medium_ by which 
_Christ_ redeemed _man_, _it_ is _said_ to be in the _ablative_ _cafe_, 
and might more properly be said to be in the _inframental_ or _med-
dal_ _cafe_. In the _third_ _infrant for_ expresses _the end_ for which 
_Christ_ redeemed _man_; the _nominative_ _successing_ it, is 
therefore in the _final_ _cafe_, or as it is commonly, though un-
meaningly, called the _dative_ _cafe_.

The _cafe_, then, or those _leading positions_ of a _nominative_ 
that an _n_ the _purpose_ of _speech_, are the _nominative_, _accus-
ative_, _genitive_, _ablative_, and _dative_. Let it be added, that 
the _nominative_, as it implies the _name_ of its _object_, is _often_ 
used merely to address a _peron_, and thus to fix his _attention_. 
In this state the _nominative_ is often considered as the _cafe_.
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sometimes preceded by the preposition or. But we have not yet done: the nominative and accusative are expressed by position; while the oblique cases, the genitive, ablative, and dative depend on words expressing beginning, medium, and end. Let us a little contemplate the consequence of these words, or words of the same import, when first introduced into discourse. As the relations of things are in the order of our ideas consequent upon the things so related, prepositions denoting those relations must at first have succeeded the nouns which they now precede and govern. Thus in the above instance, the order would have been *God of—death by—baffings for.* And it is remarkable, that in the Hindoo-fanatic the prepositions to this day generally succeed the dependent nouns, instead of going before them, as in other tongues. The consequence of this was, that the prepositions, abbreviated perhaps into single letters, coalesced with the preceding noun, forming thereby one word with it. Thus godf, godf, godf, &c. and the variety of terminations given by this means to the noun is the origin of cafes. Modern tongues, in rejecting this variety, and substituting prepositions, have only returned to the original purity of language.

Grammarians have generally concurred in defining cafes to be changes of termination. In this, if the above account be just, they are mistaken, not only because *position* is the primary and essential idea of a cafe; but because while they reject prepositions as marks of cafes, the cafes defined by them are no other than the prepositions which they reject. Conformably to this notion, they maintain that the English noun has no other than the possessive cafe; and Dr. Lowth and Mr. Lindley Murray, pursuing the same error to its consequences, comprehend nouns expressing the relation of effect, the relation of beginning, the relation of medium, and the relation of end, under one unmeaning phrase of *objective cafe,* thus confounding relations the most necessary to the purposes of speech, the most distinct in themselves, and most requisite to be kept distinct in the mind.

The idea of the most acute and learned grammarians have hitherto been confused and contradictory on the subject of cafes, especially the oblique cafes. The author of the treatise in the Encyclop. Britannica has just left the matter obscure and uncertain, as he found it. "The genitive," says he, "is the most general of all the cafes, and gives notice that some connection indeed subsists between two objects, but does not point out the particular kind of connection. Thus we must infer, not from the nature or termination of the genitive itself, but from our previous knowledge of the objects connected. That the genitive denotes merely relation in general, might be proved by adducing innumerable examples, in which the relations expressed by this cafe are different." These observations clearly shew that this writer did not himself understand the meaning of the genitive cafe, which, instead of expressing some connection between two objects, or mere relation in general, uniformly expresses one and the same relation, namely, that of beginning, medium, or origin; and of, the mark of it, has uniformly the same sense with from. Thus a table of wood, a table from wood; wood being the origin of the table. Rays of the sun, rays from the sun, the sun being the origin of the rays. And beginning will appear to be the primary idea implied in of, if we trace it to its origin; cf. ab, as, 2N, ab, parent, from root. Thus also in Latin *Dei gratia,* the grace of God, the grace from God, the grace of which God is the source. Of the phrase *injury regi* the writer says, no man can know whether the injury mentioned be an injury *suffered* or an injury *inflicted* by the king. We deny this: if the terms be used in strict propriety they must mean an injury from the king, an injury of which the king is the source and author; and, if they are intended to denote an injury received by him, the expression is incorrect and ambiguous, though the ambiguity would be removed by the context; and this leads me to remark, that as the beginning of a thing is the *author* of it; and as the author has a full right to the fruits of his labours, so that state of the noun which express begins coming to signify the *owner* or *possession.* And thus the genitive in Greek and Latin expresses the relation of possession, and answers to what is call in English the *possessive* cafe. Thus, *my father's* will may mean the will of which my father is owner; it means also the will which originated in my father. The possessive cafe, in our tongue, is an evident abbreviation of the genitive termination of the third declension in Latin, *father's house,* *father's house,* the apostrophe above supplying the place of the excluded vowel.

The same writer has not defined the meaning of the *dative,* though the relation denoted by it is the most obvious of any, contenting himself with saying, that it has nearly the same sense with the accusative, to. No two relations, however, can be more distinct; as the accusative expresses the effect of an action, and therefore stands immediately connected with that action; whereas the dative denotes the *end* to which a motion or action tends, and in which it terminates, or the point to which the attention is directed forward, as that to which something else is related. Thus, in the instance given by him, *compara Virgilium Hincia.* The immediate object of comparison is *Virgil,* and *Homer* is the point, or standard placed before me in making that comparison. The two first words express the action and its effect, the last holds to view the point to which they are directed. It is true that in this and similar instances, the mind brings under one view the person compared and the person to whom the comparison is made; and this proximity or juxtaposition constituted the affinity which the writer erroneously supposed to be between the two cafes. *Antonius fuit Cicero,* he further supposes to be explications of the same import; but in this he has been misled by the genius of our tongue, which would express each phrase by *Antony buit Cicero.* But this is the exact meaning of the first clause only. In the second clause *seu litter expresses not an action, but affirms a quality.* Antony was hurtful to Cicero. Antony was hurtful, and Cicero was a perfon to whom his hurtful behaviour was directed.

The dative cafe stands opposed to the genitive as *end* to *beginning.* The latter is the point where motion begins, the former where it terminates, and the ablative is the medium or instrument between both. In consequence of this connection between the ablative and the genitive, on one hand, it came in Latin, by the mere impulse of repeated associations, to mean in many instances the same relation with the genitive, and this is the reason why the same word often governs a genitive or an ablative, why in our own tongue of and from have precisely the same signification, and why the French and Italian express the genitive by those prepositions which in Latin govern the ablative. On the other hand, as the instrument or medium is connected with the end, the ablative holds a similar connection with the dative. Hence in Latin these two cafes are often used one for the other, which is certainly a great impromptustry in that language, and which occasioned much perplexity to the learner; while in Greek, which has not a distinct ablative, the relations of instrumentality and end are expressed by the same termination, which is certainly a great defect in that elegant and copious language. Instrumentality implies *concomitancy,* but this is not the primary sense of the ablative, as the author of the above treatise erroneously supposes.
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The Origin and Properties of Adjectives.

Things or substances are known and valuable on account of their qualities; the qualities of things therefore first engaged the attention of mankind. And as they perceived that the same quality existed in the same or in a different degree, in different things, men, however rude or uniformed, learned to form ideas of qualities independent of the substances to which they belonged. Hence they acquired that classes of words called adjectives, which are only the names of qualities. Now as qualities result from things, the names of qualities are derived from the names of things; and, as moreover qualities are constant concomitants of the things they characterize, the names of qualities are constant adjuncts of substantives expressed or implied. Hence they are sometimes called nouns; because they have been borrowed from nouns; and always called adjectives, because they are always added or added to nouns, and for this reason they have also the name of adnouns. From this account of adjectives we deduce the following inferences, which are worthy of attention.

First, adjectives expressing the simple qualities of natural objects, which do not imply motion or action, are derived from nouns, by the mind first abstracting the quality from the thing it qualifies, and then generalizing it so as to make it an epithet expressive of a similar quality in different things. Thus in πέτρα, a steep rock, the quality steep, contemplated first as a quality of that particular thing, the mind soon learned to consider as separate from the rock, and hence to make it a general term of the like quality in other objects. Thus was derived the adjective πέτρινον, πετρίνον, pron. And in the manner this single adjective is formed, are formed all the adjectives which exist in all languages.

When adjectives became numerous in any language, analogy or custom soon simplified them a particular terminus.

Hence, on every conversion of a noun into an adjective, that adjective immediately assumed the ending which analogy had appropriated to words of that class. Thus χοῖρος, food, relish, was changed into πρόσωδις, signifying agreeable food or wholesome relish. Thus also χοῖρος, wood, became χαυκόν, a word, in our own tongue. It is obvious from this to observe, that in the earlier periods of human language, adjectives approached nearer in meaning and termination to the nouns whence they were derived; that is, they were less abstracted and generalized. But the principles of abstraction and generalization were greatly facilitated, when a quality was once expressed by an independent word; the eyes and the ears being made by that means to aid the conceptions of the mind. This is the reason why a barbarous people have few or no adjectives; and why, in the more ancient dialects of the East, the use of adjectives is far less frequent than in the more recent languages of Europe.

In speaking of the qualities of things, similitude or resemblance is an idea of high importance and frequent recurrence. A person discomposing to another of something unknown, naturally says, that it is like to some other that is known. Thus in Greek ὡς, image; ὡς, form; ὡς, like; are combined with nouns in order to express likeness: ὡς ἡμέρα, man-like; ὡς θεός, having the form of a God, God-like, i.e. the form of a God, God-like; adjectives, man-like. This last terminus, by inferring ὡς, gave birth to the Latin adjectives in ofis, and to our adjectives in our; pecunia, pecunious; glor, glorious. The numerous adjectives and adverbs in English are formed on the same principle. Earthly, i.e. earth-like, which is the Greek ἑαυτόν. Gladness is gladness, the same with glad; same or some being, we conceive, corruptions of similis. The termination /s is originally the Persian /s, added to a noun to express likeness; as /s, the moon; /s, gladness, like the moon; /s, a woman. The termination en, derived, it is allowed, from the northern language, is borrowed by that language from the Greek participle en. In the same manner we form some adjectives after the analogy of the past participles in ed, as boned, wooded; while that of y is the Anglo-Saxon in; but this is only the Latin termination en; as voces, Anglo-Saxon or y.

But it must not be omitted that a very numerous class of adjectives is derived from verbs, and that independently of participles. Of this origin are all those adjectives which denote actions: as /s, and that denotes a substance. If then I say a gold-ring, a brazen tube, a filk-string, here are the substantives used adjectively, yet names of things, and denoting substantives. If again I say a golden ring, a brazen tube, a filk-string, do gold and brass and filk cease to be the names of things, and cease to denote substantives, because, instead of coupling them with ring, tube, and string by a hyphen thus (-), I couple them to the same words by adding the termination en to each of them? Do not the adjectives which I have made such by the added termination golden, brazen, a filke, convey to the reader his mind, and denote the same things as gold, brass, and filk? Surely the termination en takes nothing away from the substantives gold, brass, and filk, to which it is united as a termination; and as surely adds nothing to their signification, but this single circumstance, viz. that gold, brass, and filk are designated by this termination en to be joined to some other substantive? p. 430. Again he says, p. 442, "But if, indeed, it were true that adjectives were not the names of things, there could be no attribution by adjectives; for you cannot attribute nothing. How much more comprehensible could any term be by the attribution to it of nothing? Adjectives therefore, as well as substantives, must equally denote substantives; and substance is attributed to substance by the adjective contrivance." He concludes with what Dr. Jonathan Edwards says of the language of the Muhekanem Indians. "The Mohicans have no adjectives in all their language, although it may at first seem not only singular and curious, but impossible that a language should exist without adjectives, yet it is an indubitable fact." This account, instead of unfolding that simplicity and precision which mark the process of the human mind in the formation of language, tends to erode the very elements of knowledge, and to confound ideas the most palpable and distinct. Our ideas naturally and obviously divide into two classes, ideas of qualities and ideas of things. The distinction between these classes is universal; it is common to the philosopber and the bulk of mankind; and is most readily comprehended even by children. As we have then ideas of qualities, language must have words to express those qualities, i.e. it must have adjectives; and as our ideas of qualities are in their nature distinct from, though connected ideas of things, so adjectives must in their nature be distinct from, though adjectives of nouns.
The first step in the formation of adjectives is **abstraction**; the mind being led to conceive of the quality independent of the thing, in consequence of perceiving it in different things. The frequent recurrence of the quality, which is one and the same, and therefore remembered, while the instances which present it are numerous and successive, and therefore forgotten, greatly facilitates our abstract conception. A similar facility, as we have already observed, is afforded by the independent use of words to express qualities. The dependence of adjectives on the principle of abstraction is evident from one circumstance. **Like** is a very abstract quality; and the union of this word with nouns is one copious source of adjectives in most languages of which we have any knowledge.

The next step in the formation of adjectives is **afficiation.** This principle is so powerful and infalliable, that it changes the nature of a word, in consequence of its connection with other words, and of our previous experience. Thus, "the ladies fan themselves"—"The pluney people eye the falling verdure." Because we have experienced the middle term of a simple direct proposition to be always a verb, we instantly, in the above examples, conclude that fan and eye do not here denote the things usually meant by them, but the operations of those things; that is, association and experience convert the nouns fan and eye into verbs, without any thing to aid or indicate that conversion but association suggested by the collocation. This conversion of a noun into a verb by simple experience, illustrates the conversion of a noun into an adjective. We place a word signifying a quality before a word denoting a substance; and as we uniformly find that qualities belong to the things which they quality, and first act upon our perceptions, we instantly infer from the collocation that the first expresses an attribute of the second; and this attribution is not indicated by the termination of the attributive, but an inference of the mind founded on experience. The termination by signifying to be added is a conceit of this grammar, and has no foundation in truth: for it is the Greek participial termination on, borrowed by the Goths. The formation of language did not require such petty, circuitous contrivances; but points to the broad and simple principles of abstraction and affection as the copious sources of all its phenomena.

From this it appears, that a peculiarity of termination is not necessary to form an adjective, the collocation being sufficient to ascertain its character as such. An adjective may have the same ending with any other noun, or with the very same from which it was derived; and it has this identity of termination in Greek and Latin, and yet no ambiguity arises as to its nature and use. The inference, which we instantly, and we may say, imperceptibly, draw from the juxtaposition in our own tongue, and from the similarity of terminations in the classical tongues, is an unerring guide in these respects. And this is the reason why, in a barbarous language, it is possible that the name of a quality may be always the same name with the name of the thing to which that quality belongs, and yet abound with adjectives, i.e. abound with nouns converted into adjectives by juxtaposition. And this is all that can be meant by the testimony of Dr. Edwards, in regard to the language of the Mohicans. If there existed a language which had no verbs, but nouns converted (as in the above instance of fan and eye) into verbs without any variation of termination, a person who did not understand the nature of the human mind, and who had been accustomed to classify words only by their endings, might lay of that language, that it had no verbs.

The foundation of Mr. Tott's error, is the circumstance that most adjectives were originally nouns. As they were nouns in their origin, and as he rejected the operations of the mind in the construction of language, he inferred with confidence, that they were nouns full, thus confounding in one promiscuous mass our ideas of qualities, and our ideas of things; yet, notwithstanding this confusion, he writes thus: "If in what I have said of the adjective, I have expressed myself clearly and satisfactorily; you will easily observe that adjectives, though convenient abbreviations, are not necessary to language; and, therefore, are not ranked by me amongst the parts of speech; and, perhaps you will perceive, in the misapprehension of this useful and simple construction of language, one of the foundations of those heaps of folly philosophy and obscure (because mistaken) metaphysics with which we have been bewildered."

Adjectives, as expressing not things, but their qualities, cannot, in strict propriety, have any gender; but, as in Greek and Latin, they have the same terminations with nouns, they are said to be masculine, feminine, or neuter, merely as they have masculine, feminine, or neuter terminations.

In most languages, adjectives vary their endings to correspond with the plural form of nouns; in English they have no such variation, nor is it necessary, since qualities are not susceptible of numerical distinction, being the same, whether applied to one or to many.

There is, however, one variation which adjectives have in all languages, namely, the variation to express the three degrees of comparison. The qualities of things differ in different objects, and must be expressed with augmentation or diminution, as they are compared with others more or less intense.

When a quality is expressed without reference to any other, the adjective is then said to be in the **positive** degree. When expressed with reference to the same quality or to another more or less intense, it is said to be in the **comparative** degree; and when in the highest or lowest degree of all, it is in the **superlative**. Different languages have different ways of forming the comparative and superlative; but in almost all, both these degrees are derived by certain syllables added to the positive: the adjective itself, by being thus lengthened, is made to correspond with the augmentation in feme, which the quality acquires by comparison. The mode of expressing the degrees of qualities being only two, and therefore very general and imperfect, while the qualities themselves vary in endless gradations, a more adequate method is used, by having recourse to those attributes of an inferior order, called **adverbs**, as much good, tolerably good, exceedingly good, more good, most good.

As it is not our object to detail the minute rules of grammar in our own tongue, we shall conclude this part of the subject with one or two observations on the three degrees of comparison. The **positive** degree, though not implying an immediate comparison with the same quality in a higher or lower degree, often conveys a relative or comparative idea; and for this reason may, by the assistance of a preposition, be made to express the comparative or superlative degree, as "Blessed among women, i.e. the most blessed of women." And this relative or comparative idea, implied in the positive, is the reason why the positive has sometimes after it the word which is used after the comparative. On the other hand, the comparative and superlative are used in a positive sense, or used to express a high degree without any immediate object of comparison. Thus Virgil speaks of Venus: "Tristior et lucernis occuas suis nigritas,"—"Tristior, more sad than usual, i.e. very sad. This is more usual in the superlative degree, *vir dejectus, a very learned man*. The comparative is used with propriety only when two things are compared;
The Origin and Properties of Pronouns and Determinatives.

Pronouns have been defined substitutes for nouns, to prevent their too frequent recurrence. Mr. Harris accounts for pronouns, or, as he calls them, *nouns of the second order,* in a different way; and, as his explanation is curious, we shall here place it before our readers. *All conversacion passes between individuals, who will often happen to be till that instant unacquainted with each other. What then is to be done? How shall the speaker address the other, when he knows not his name? or how explain himself by his own name, of which the other is wholly ignorant? Nouns, as they have been described, cannot answer this purpose. The first expedient on this occasion, seems to have been pointing or indicating with the finger or hand; some traces of which are still to be observed, as a part of that action which naturally attends our speaking. But the authors of language were not content with this: they invented a race of words to supply this pointing, which words, as they always stood for substitutes or nouns, were characterized by the name of pronouns. These, also, they distinguished into three several sorts, calling them pronouns of the first, the second, and the third person, with a view to certain distinctions, which may be explained as follows.

"Suppose the parties conversing to be wholly unacquainted, neither name nor countenance on either side known, and the subject of conversation to be the speaker himself. Here, to supply the place of pointing, by a word of equal power, the inventors of language furnished the speaker with the pronoun *I.* It signifies, *I say, I desire," &c.; and as the speaker is always principal with respect to his own discourse, this they called, for that reason, the pronoun of the first person. Again, suppose the subject of the conversation to be the party addressed. Here, for similar reason, they invented the pronoun *thou; thou writest, thou walkest," &c.; and, as the party addressed is next in dignity to the speaker, or at least comes next with reference to the discourse, this pronoun they therefore called the pronoun of the second person.

"Lastly, suppose the subject of conversation neither the speaker nor the party addressed, but some third object different from both. Here they provided another pronoun, *he, she, it;" which, in distinction to the two former, was called the pronoun of the third person. And thus it was, that the pronouns came to be distinguished by their respective persons."
GR. AMMAS.

Thus previous I it never an Mr. And lliaig we, her, derived fee corruption the for as the Greek and Latin do not abound with the same analogy, and therefore frequently use the personal pronoun in the genitive as equivalent to the pronominal adjectives.

The reciprocal or reflex pronomn self is added to: pronominal adjectives as myself, thyself, &c. The third person singular and plural by analogy should be his self and theirselves but in order to humour the ear or the organs of speech, these are changed into himself and therefore. Self means an individual in opposition to another, and is derived from the Latin self, along the medium of the Anglo-Saxon selfe, soul, Anglo-Saxonselfe, selfe: hence also fest, which means that part of man in which confines the vital principle in opposition to the body: even, when used to precede self, is a corruption of the Anglo-Saxon ges, which by the infusion of the letter g, after the analogy of that language, is borrowed from the Latin genus. Genself, therefore, is myself.

Mr. Harris gives the following account of that species of adjectives called definitives or articles: “The visible and individual existences of nature are infinitely more numerous than for each to admit a particular name. To supply this defect, when any individual occurs, which either wants a particular name, or whose proper name is not known, we ascertain it as well as we can, by referring it to its species: or if the species be unknown, then at least to some genus. For example, a certain object occurs with a head and limbs, and appearing to possess the power of self-motion and sensation: if we know it not as an individual, we refer it to its proper species, and call it dog, or horse, or man, or the like. If none of these names fit, we go to the genus, and call it animal.”

“Thus it is not enough: the thing at which we are looking is neither a species nor a genus. What is it then? An individual. Of what kind? Known or unknown? Seen now for the first time, or seen before, and now remembered? It is here that we shall discover the use of the two articles a and the. A respects our primary perceptions, and defines individuals as unknown: the respects our secondary perception, and denotes individuals as known. To explain by an example: I see an object passes by, which I never saw till now. What do I say? There goes a beggar with a long beard. The man departs, and returns a week after. What do I say then? There goes the beggar with the long beard. The article only is changed, the rest remains unaltered. Yet mark the force of this apparently minute change. The individual, once vague, is now recognized as something known, and that merely by the efficacy of this latter article, which tacitly infinuates a kind of previous acquaintance, by referring the present perception to a like perception already past.

“The truth is, the articles a and the are both of them definitives, as they circumscribe the latitude of genera and species, by reducing them for the most part to denote individuals. The difference between them, however, is this: the article a leaves the individual itself uncertain, whereas the article the ascertains the individual alto, and is for that reason the more accurate definitive of the two.”

We give this statement as that of an eminent grammarian, without subfixing it to as it but in all respects. It is not, we conceive, true, to say that the individual defined by a is always uncertain; nor does the necessarily imply a previous acquaintance, by referring the present perception to a like perception already past. And we cannot help observing that, if Mr. Harris and other writers on the subject had traced those words to their sources, and thus ascertained their primary meaning, their readers would have been more informa-
ed in one paragraph, than they otherwise could by the most elaborate treatise.

The article a is in truth the numeral adjective in Greek, but in Latin, in Anglo-Saxon; and the import of it precisely corresponds with its original signification of one. A book is one book; a man is one man. Hence we may learn with certainty the following particulars. That it is enveloping the word in mystery to call it an article, instead of calling it by the more appropriate name of numeral adjective, or indefinite. That as it means one it cannot be prefixed to plural nouns, unless these nouns be taken in a collective sense. That the usual rule, as before a vowel, should be just reversed in order to be true. "As becomes a before a consonant." That the equivalent of the article a exists in Greek, and in Latin, but is rejected as useless in those languages; and that the frequent use of it in English and other modern languages is far from being necessary, that it is an incumbrance and inleagance. I see man would be as intelligible as when we say I see a man; and they read book, as definite, as they read a book; and this, from the nature of the cafe, just as in Latin, video hominem, legunt librum, where unum would be both unnecessary and inexpressive. The English I see man, and the Latin video hominem, are both equally indefinite in themselves; but they are sufficiently limited by the nature of our perception, and by previous experience. "The indefinite article," says the author of the treatise on Grammar in the Encyclopaedia Britannica, "is much less useful than the other; and therefore the Greek and Hebrew languages have it not, though they both have a definite article. In languages, of which the nouns, adjectives, and verbs have inflexion, no mistake can arise from the want of the indefinite article; because it can always be known by the terminations of the noun and the verb, and by the whole circumstances predicated of the noun, whether a whole species or one individual is intended. But this is not the case in English. In that language the adjectives having no variation with respect to gender and number, and the tenses of the verbs being for the most part the same in both numbers, it might be often doubtful, had we not the indefinite article, whether the specific name was intended to express the whole species or only one individual." All this reasoning, however, appears to us fallacious, and only shews that even a wise and able man, such as the writer of this article certainly is, will readily think that necessary and useful to which he has been accustomed, and therefore will demand he be at a loss for some plausible reasons to justify it. In truth, the inflexions of adjectives and verbs in the learned languages alluded to, have no influence whatever in defining the extent of the general term, but serve merely to shew that they qualify that term, and depend upon it. The very example adduced by this writer shews the fallacy of his reasoning: *EYmenos apoxiomevos* pev Biajepxaln beetos. Here *apoxiomevos* as clearly denotes not the whole species, but an individual, as it was written *apoxiomevos* and that not because of the singular correspondence of *apoxiomevos* nor from the termination of *apoxiomevos*. Of this there is an evident proof; *apoxiomevos* and *apoxiomevos* would be full the same, though *apoxiomevos* had a specific or collective sense. But the individual sense of the noun appears from the nature of the case, from the context, and especially from the clause, *apoxiomevos* name *apoxiomevos* John: and these circumstances, which sufficiently define it in Greek, would be sufficient to define it in English, were it written "Man was sent from God whose name was John." It is impossible to feel in this as y ambiguity; and the exprefdon seems uncoutly only because we have been accustomed to the use of a man was sent from God, &c.

Mr. Tooke derives the and that from the Anglo-Saxon verb

then or thereon, to take. But these definitives exist in that language, and why should he attempt to derive them from any word, when they are already formed and employed in the same sense? He seems to have been aware of this objection. And he adds, vol. ii. p. 60, "The (our article, as it is called) is the imperative of the base verb given us, which may very well supply the place of the correspondent Anglo-Saxon article fe, which is the imperative of feon, videre. For it answers the same purpose in discourse to say—see man, or take man." The English take, and the Anglo-Saxon than, which this writer would lead us to regard as a primitive northern word, is only the Greek *tau*, to accept. Take this, therefore, means, receive this.

Light is the medium of light, and, hence, in the most ancient languages, the word signifying light gave birth to verbs signifying to see. Thus the Hebrew *kvef* *tau*, pronounced in Arabic *thaw*, but in Persian *fe*, light, is the parent of the Anglo-Saxon *seon* and our *see*, which accords with the Persian pronunciation, and also of the Anglo-Saxon article *fe* or *for*, or as we found it, conformably to the Arabic, the. It is remarkable the article in Greek is founded entirely on the same principle, though derived from a different word. For its original appears to have been the Hebrew article *ma*, which probably was *mou* or *bo* short, and which is but an abbreviation of *ma* *thaw*. Now the use of this last confills in directing the attention to an object, and answers to en or ree in Latin, and behold in our own tongue. And as the necessary congequence of looking upon a thing is to see it, as distinguished from other things, hence *ma* in Hebrew, and in English, from signifying to perceive, through the medium of light, came to signify an effect of perception, namely, the distinction or opposition which the thing to be seen has to other things which may be related to it.

From this account we may gather the following particulars respecting the nature and use of the definite article. Its primary force consists merely in directing the eye to the attention to an object; and the indefinite power assigned to it is rather an effect of the light where the object is present, or of the mind in drawing the necessary inference, where the object is previously described or specified. If this account be just, the assertion of Mr. Tooke, that the article, in combination with a general term, is a mere substitute for a particular term, (see vol. i. p. 69,) is erroneous. The article is only an index; having indicated the thing intended it does no more: the eye or the mind does the rest, and the general term is defined or made particular, by being brought under immediate inspection. It is necessary to subjoin the general term to the article, because it is necessary to specify the object intended; but the restriction of the specific or general noun to that individual object is a consequence of the article, rather than a power belonging to it. The article therefore cannot be a mere substitute, to do that which is done by another principle, namely, the eye or the mind.

The article serves as an index to specify an object hitherto unknown, as well as one previously known; and thus Mr. Harris's distinction, that a respects our primary perception, and denotes individuals as unknown; the respects our secondary perception, and denotes individuals as known, is confined. The index indeed may be directed to a past event or object, thus to make it the subject of inspection a second time. In this view Mr. Harris's position is true, but the use of the article is far more general, and by no means confined to such cases.

The article the is the name in origin, and often in use the same with that, and indeed in the Anglo-Saxon that is only the neuter gender of the; and Mr. Tooke ought to have made this remark instead of representing each as independent of the other. This
This definitive is in our tongue variously applied; and the objects of its application are to distinct and different, that it has been thought to change its nature, and to belong to different parts of speech. And Mr. Tooke has the merit of being the first to show that in all circumstances, that retains one and the same character. Let us briefly consider its various applications. And first, it is used to bring under the eye of the mind, i.e. to define individual objects or things, as in this: In this sense, it is equivalent to this, answering to as opposed to his in Latin. I.e., that, denotes the remoter of two objects, as, this, the nearer. "Alexander and Julius Caesar were great commanders, that (fill-) conquered Asia; that (hie) subdued the Gauls—that, meaning Alexander as the farthest off; this, Julius Caesar, as the nearest." In such a sentence it would be more usual to say the former and the latter. Second, that is frequently used to characterize a subject clause, which is the object of a transitive verb, thus serving to fix the attention on what is going to be said, and by that means to render it emphatic and prominent. Thus, "I with you to believe that, that thing which I am going to say, namely, I will not hurt a fly," which Mr. Tooke thus resolves, "I would not willingly hurt a fly; I wish to believe that affection." In this sentence it answers to quod in Latin. Third, that is an index to point out the end or purpose which a person has in view, and as such precedes a verb in the subjunctive mood without a preceding that end: Thus, "They never rise in the night that they may steal." Thieves rise in the night, that being their purpose, namely, they might steal. In this sense it corresponds to the Latin conjunction ut, which, perhaps, led to the error of considering that as a conjunction in the second and third persons. Fourth, that is an index pointing to a noun in the preceding clause, and is a substitute for that noun, or rather it agrees with that noun implied, though never expressed. "The man, that hath not music in himself, is fit for treason." Here the first clause, the man, is represented as definite, while the reader as yet is not able to recognize it as such. What man is fit for treason? To preclude the necessity of this question, a clause is introduced, that man, namely, he who hath not music in himself. In this sentence that is thought to be a relative equivalent to who, which may be substituted for it. But in reality it is still a definite, used to ascertain the preceding specified noun, which has the form of being definite without being really so, and the preceding noun is to be repeated, or, as that is descriptive, a generic or specific noun of the same import is understood to be introduced. Thus the man, namely, that fit of man, who hath not music in himself, is fit for treason. The subject of discourse may be plural, and yet the singular form of that, may, on this supposition, be used. "The men that have not music in themselves, are fit for treason," i.e. the men, that fit of men, namely, who have not music in themselves, are fit for treason: and this is the solution of the apparent anomaly of that being used in both numbers, without variation, when taken relatively.

We come next to speak of the relative pronoun, which Mr. Harris thus explains, p. 77. "But besides thehe there is another pronoun (in Greek ὃς, ἃ, in Latin qui, in English who, which), a pronoun having a characteristic peculiar to itself, the nature of which may be explained as follows. Suppose I was to say light is a body, that light moves with great celerity; the sentence would apparently be two distinct sentences. Suppose, instead of the second light, I were to place the prepositive pronoun it: Light is a body; it moves with great celerity; the sentence would be still distinct and two. But if I add a connective (as for example and) saying light is a body, and it moves with great celerity; I then by connexion make the two into one, as, by cementing many stones I make one wall.

"Now it is in the united powers of a connective and another pronoun, that we may see the force and character of the pronoun here treated. Thus, therefore, if in the place of and we substitute that or which, saying light is a body, that body moves with great celerity; the sentence still retains its unity and perfection, and becomes, if possible, more compact than before. We may with just reason, therefore, call this pronoun the subjunctive, because it cannot, like the prepositive, introduce an original sentence; but only serves to subjoin one to some other which is previous." This account, though elegant and precise, we nevertheless deem erroneous, because the relative pronouns in all languages are the same in their origin and use with the articled or definite pronouns. In Greek ὃς is only the article ὃ with an annexed after the analogy of that termination in Greek nouns. Hence: the reason why ὃ and ἢ are, by the more ancient writers, such as Homer and Herodotus, used for one another, either as demonstrative or relative pronouns. The Latin eus is also the article ὃ with a guttural annexed—bac; while qui, which Scaglier, and after him Mr. Tooke, derive from eus, is no other than the Persian ke or chs, who, which. Moreover, qui is the Oriental κο, who or w̃ho, and it is remarkable that in Hindostan eus is re-established as is, and this has been imported into Latin quippe. Finally, our who is the Greek ὃs, having the labial w̃ substified for the aspirate, which is a broad and general analogy, by which words in Latin and the Anglo-Saxon are formed from Greek or from the Oriental tongues. Which is the neuter termination of ὃ, formed on the same principle as bac in Latin, that is, a guttural is annexed to who, whose, which. And this is the reason that, while who is applied to persons, which is made to stand for inanimate things.

As the relative and definite pronouns have the same origin, they are also the same in use. For in Latin the relative always supposes the antecedent to be repeated, and is repeated when obscure or doubtful. In our own tongue, indeed, who never coalesces with the antecedent noun, and is therefore a substitute for it, and this peculiarity in our own tongue has caused who, with its other cases whom, whose, to drop its nature as a definite, and to become really a pronoun, i.e. a substitute for a noun. This peculiarity has also obtained in regard to kis, which was the Hebrew and Greek article π, πο, or Ἰσα. And this is the reason why the article in Homer may be often rendered by ke in our own tongue. Dr. Middleton, not perceiving this circumstance, was led, in a voluminous work published on the Greek article, to suppose that the Greek article is in its nature a personal pronoun, and may he always resolved into a pronoun. The foundation being thus fallacious, the whole superstructure, however learned and elaborate, is frivolous and useless.

We observe farther that his, its, and its, which are really definite, often refer, like qui, to a preceding noun, and for this reason have a claim equally just to be called relative pronouns. Thus, "Deus nobis hic est fact; neque enim ille militem Deum; illius asinum facere tener nelris in ovilibus imbnat agnus." Here the first ille is ille bone, or ille juvenis, meaning Augustus, elegantly kept out of sight, the reader being left to conceive of him only as a god; while illius is illius de, of that god. "Tres litteræ serva proscript concinnarent, hoc tota armata sequantur, i.e. hos corros." "Cognoscimus Deus ex operibus ejus," we know God from the works of the same—ejus de.

Because the relative qui is thus a definite, the defined noun, when not antecedent, is made to succeed in Latin and
and in Greek, as "Maximus laborbus sequuntur eam, quam ex difeudo capittis, voluptatem;"—literally, with the greatest toll they pursue that, which pleasure, (for that pleasure, which) they derive from flady. "Quas condulit arcem, ipfa colat,"—let her inhabit which citadels the built, for, let her inhabit the citadels which the built. In our own tongue such an arrangement is not allowed, or even illegible, because here the relative really is a substitute for the noun preceding it, and refuses to confide with it as an adjective. And it is obvious to remark in this place, that with the exception of who in English, the articles or definitives are not pronouns, but adjectives, numeral or restrictive, agreeing with a noun expressed or understood, and to be supplied from the context or the preceding clause. We remark, finally, that as articles are definitives, the Latin tongue has not only one but several articles, which is erroneously supposed to want. Thus, hic homo, this man, ille homo, that same man, ipse homo, that every man, are phrases, either of which is equally definite and emphatic with one the man, and on many occasions precisely the same with it.

Before we quit this subject we shall advert to a question proposed and solved by Mr. Tooke, vol. i. p. 273. "What is as?—The truth is that as is also an article; and however, and whenever, used in English, means the fame thing as is, or that, or which. In the German, where it still evidently retains its original significations and use, (as so also does, it) is written es."

Now, if Mr. Tooke had properly understood the nature of the article, he would not have made this assertion. As indeed, like the article, is an index, but it is an index directing the mind from one object to another, and the consequence of its being so directed is the perception of some resemblance between them. Accordingly as is is, an adjectival in Latin, in Greek, being inverted (as is often the case with monoaffixable words), has become ἄσ. On the other hand, the consequence of the indication conveyed by the article is not to the observance of some likeness between the objects specified, but the limitation of the general term to the individual object, circumvibled by the eye or the mind by being so indicated.

In a note this writer adds: "Dr. Lowth, amongst some falfe English which he has recommended, and much good English which he has reproved, says, "fors, was used by the writers of the last century to express a consequence instead of fo that. Swift, I believe, is the last of our good writers who has frequently used this manner of expression."

If that denote end or consequence, the third feminine we have affined to it in the preceding page, and if as, on the other hand, signify similitude between two objects, ἄσ is, as Dr. Lowth states, very improper; while ἄσ that alone is good English and good sense; and Mr. Tooke is himself guilty of the charge he brings against Lowth, namely, of recommending some falles, and reproving much good English. We cannot help observing that the object of comparison marked by ἄσ is often implied, and is to be gathered from the context; as in the following stanza:

Save that from yonder ivy-mantled tower,
The moping owl does to the moon complain
Of ‥‥ as, wandering near her secret bower,
Moleft her ancient solitary reign.

today, of such preterit, as those who wandering, &c.

The Origin and Properties of Verbs.

We shall begin this part of our subject also with an extract from Mr. Harris, because his opinion, though plausible, is erroneous, and has been the means of leading other grammarians, who followed his authority, into error. "We are now," says he, "to defend to the common herd of attributes, such as black and white, to stand, to speak, &c. among which, when compared and opposed to each other, one of the most eminent distinctions appears to be this. Some, by being joined to a proper substantive, make, without farther help, a perfect affirmative sentence; while the rest, though otherwise perfect, are in this respect deficient. To explain by an example, when we say Cicero eloquent, Cicero is the subject, there are imperfect sentences, though they denote a substantive and an attribute. The reason is, that they want an afiernion to shew that such attribute appertains to such substantive. We must therefore call in the help of an affermion elsewhere, an is or est, to complete the sentence. Cicero is wife, Cicero was eloquent. On the contrary, when we say Cicero convicted, Cicero is convicted, in instances like this there is no such occasion, because the words convicted and convicted imply, in their own form, not an attribute only, but assertion likewise. Hence it is they may be resolved the one into is and writing, the other is and writing.

"Now all these attributes, which have this complex power of denoting both an attribute and an assertion, make that species of words which grammarians call verbs. If we resolve this complex power into its distinct parts, and take the attribute alone, without the assertion, then have we participles. All other attributes, besides the two species before, are included together in the general name of adjectives; and thus it is that all attributes are either verbs, participles, or adjectives. Besides the distinctions above-mentioned, there are others which deserve notice. Some attributes have their essence in motion; such are to walk, to fly, to strike, to live. Others have it in the privation of motion; such are to stop, to rest, to conceal, to live. And lastly, others have it in subjects which have nothing to do with either motion or its privation; such are the attributes of great and little, noble and base, and equal and unequal, and in a word the several quantities and qualities of all things. Now these last are adjectives; those which denote nations or their privation are either verbs or participles.

"Of all the constituent parts of speech," says the writer in the Encyclopaedia, Britannica, 58, "none has given the grammarians greater trouble than the verb. The vast variety of circumstances which it blends together in one word, throws very considerable difficulties in the way of him who attempts to analyse it and ascertain its nature; at the same time that by its eminent use in language, it is entitled to all the attention which can be bestowed upon it. It should seem that the first object of our investigation ought to be the characteristic of the verb, or that which all these words have in common, and which constitutes them verbs, distinguishing them from every other species of words. Now it is obvious to the slightest attention, that every verb, whether active, passive, or neuter, may be resolved into the subjunctive verb is, and another attribution: for Hebe is of the same import as is he aged; and aged with aman is.

"But loving and aman are not verbs; whence it follows that the characteristic of the verb, which constitutes it what it is, and cannot be expressed by other words, must be that which is signified by the word is; and to us that appears to be neither more nor less than affection.

"Affection therefore, or predication, is certainly the very essence of the verb, as being that part of its office, and that part only, which cannot be discharged by other kinds of words. Every other circumstance which the verb includes, such as attribute, mode, time, &c. it may be possible to express by adjectives, participles, and adverbs; but without a verb it is impossible to predicate, to offer or deny."
any one thing of any other thing. The office of the verb, when stripped of all accidental circumstances, forms to be merely this: to join together the subject and predicate of a proposition; its powers are analogous to those of the sign + in algebra, which does not affect the separate value of the quantities between which it is placed, but only indicates their union or conjunction. The writer then, in illustration of this theory, takes the examples used by Mr. Harris, and then adds, "in resolving every verb, whether active, passive, or neuter, into the subjunctive verb is, and another attributive, we have the honour to agree with all the grammarians."

We respect the opinion of other grammarians, and that of this writer in particular, but we cannot think it an honour to agree with him and his predecessors on this subject; but we rather think it an honour to differ with them, because we conceive them to be in an error. Now the most sure way to ascertain the characteristic of a verb, or that which constitutes its essence, is to attend to that operation of the human mind by which verbs have been formed. But as the affirmative is thought essential to all others, we shall begin with it. And Mr. Harris thus explains it, p. 88, "Previous to every possible attribute, whatever a thing may be, whether black or white, square or round, wise or eloquent, writing or thinking, it must feel of necessity exist, before it can possibly be any thing else." For existence may be considered as an universal genus, to which all things, of all kinds, are at all times to be referred. The verbs, therefore, which denote it, claim precedence of all others, as being essential to the very being of every proposition, in which they may still be found either expressed or by implication; expressed, as when we say, "the sun is bright," by implication, as when we say, "the sun rises;" which means, when resolved, "the sun is rising."

According to this explanation existence is the primary idea of is; and Mr. Harris is little consistent with himself when, in resolving active verbs into this and another attributive, he supposes it to mean affect. But let us deduce a more adequate idea of it from examples—God is good; His food shall be honey, and wild honey; if we are virtuous we shall be happy. In the first of these, is connects good with God; in the second one connects honey and wild honey with God, and affects, that with regard to John they were the same. In the third instance, happy is, by shall be, represented a quality of be. For this reason the following terms would be more appropriate to any other. The leading noun the subject, the thing connected the predicate, and the verb connecting them the connecting verb. Thus, God is the subject, is the connecting verb, and good the predicate; and so in all other instances.

If then is be the characteristic or essential idea of every verb, and if farther, as appears from fact, the primary idea of is denotes a mention, it follows that not affectation, as the grammarians have hitherto supposed, but connection, is that which constitutes verbs, or that which distinguishes them from other species of words. But the connecting verb itself will not appear necessary, if we judge of its use in the ancient languages, the juxtaposition of the subject and predicate being sufficient to supply its place. Thus we say, to write, hēlêd the mur-derer; there verses, being placed by the side of a sôd, suggests that it belongs to it, and by virtue of this suggestion conveys to the mind as full and complete a proposition as though the connecting verb had been inserted. Thus too in Latin, Hanc precipitam opus Dei, man the principal work of God, meaning man is the principal work of God. Thus also in Hebrew, And Moses said unto God, who I, that I should go unto Pharaoh; and God said, certainly I will be with thee, and this taken unto thee, i.e. this shall be a token unto thee, ii. 11, 12. In this tongue, indeed, the subjunctive verb is comparatively of rare occurrence, and its place is supplied by the collocation of the terms to be connected, a principle in itself extremely simple, and suggested by the great law of the human mind. In Greek and in Latin its use indeed is more frequent; and it is remarkable that where it does occur, it generally occurs either in the beginning or the end of the clause, and not in the middle, a circumstance which arose from a desire of keeping together words that are related as subject and predicate. Now Mr. Harris and other grammarians, overlooking the force of juxtaposition, and judging of the importance of the subjunctive verb from its frequent use in modern speech, have hence supposed that it is absolutely necessary to the existence of language, and that no proposition can be communicated without it. And what is more remarkable still, "they have represented a word as essential to a verb, which, far from being necessary to a verb, is not necessary even to language."

Verbs express the operations or the active qualities of things; and as the growth of words corresponds to the growth of our ideas, it follows that verbs originally were the names of things; but by combining them with the personal pronouns, they became, in consequence of the allocation of ideas, to express not things, but their operations. The conversion of nouns into verbs we will illustrate by an example in the Greek tongue. Mr. Jones, in his Grammar of that language, has shown that the personal terminations of the Greek verbs are but corruptions of the personal pronouns, and all the variations of mood, tense, number, and persons have originated in these five elementary principles, thus:

\[
\begin{align*}
\text{εγώ} & \varepsilon\gamma, \\
\text{nó} & \nu, \text{θοῦ}, \\
\text{δο} & \delta, \text{κεῖ}, \text{σύ}, \text{αὐτός}.
\end{align*}
\]

Now let these in their corrupted state be annexed to any noun, for instance to ἄνθρωπον, man; and we shall have ἄνθρωπον, man; ἄνθρωπον ἱππό, horse; ἄνθρωπον ἡμέρα, day; ἄνθρωπον ἄρχω, I govern; ἄνθρωπον ἄφημι, I leave; ἄνθρωπον ἔρχομαι, I come; ἄνθρωπον ἐλθώ, I go. When the attention of the speaker or hearer was fixed on the first of these combinations, the union of the two words which signified being and was, and wine could not fail of bringing to his mind the circumstances which he had previously experienced or observed in regard to that liquid; and hence he necessarily recalled the idea of making or taking wine, or drinking wine. Consequently, the two terms thus combined he naturally employed to express one of those notions. A similar process took place with regard to the remaining five combinations. And thus have we in Greek, and other languages, verbs diversified by the personal pronouns. This extension of the names of things to signify the actions which these things have been observed to perform, is, it is obvious, founded on the law of association, and may be illustrated by many instances in all languages. But the principle is not so clear in any tongue as it is in Hebrew, where the personal pronouns annexed to the verb are preferred with little variation from what they are in their independent state.

In the above, and similar other examples, the agent, and that which is the effect or object of the action, combine to express that action; but in other combinations, the name of the agent alone is sufficient to express its operation. Thus, "the ladies him themselves," "the plumy people the falling verdure." Now having previously observed the use or action of the him, and learnt in ourselves the effect of the eye, being also previously aware that in a simple direct proposition,
position, the second usually denotes operation, we should immediately infer that *fan* and *eye* here express not the things meant by them but their active qualities; in other words, our previous associations would instantly convert those nouns into verbs, though we had never seen them so used before.

From this account of the deduction of verbs from nouns and *predicaments*, we may ascertain their nature and properties. A verb is a word borrowed from a thing to express the action of that thing. It implies connection, the connection of an agent and its object, or more generally the connection of cause and its effect. But this connection is not expressed by an independent word but by the juxtaposition, or the combination into one word of the agent and its object. On the other hand, it does not imply *affirmation* or *assertion*, as grammarians have hitherto supposed, because no word expressible of this enters into its composition. The operation of a verb is indeed positive; and therefore that implication which writers on this subject call *affirmation* may be considered to belong to it, but this is rather an inference formed by the mind than a property inherent in the verb; and is confined to a certain mood or form of it. We understand the indicative to affect, but this affirmation is lost in the imperative, subjunctive, and infinitive. So that if *affirmation* be essential to a verb, a verb ceases to be a verb in these moods.

A verb implying an abstract idea, and therefore often indefinite and obscure, may be ascertained in regard to its meaning by recurring to the noun from whence it has been derived. This noun, which probably is the name of some sensible object, fugis its primary sense; a circumstance of great importance in the construction of a *philosophical dictionary*, a work existing in no language, and much wanted in every language. "The most necessary verbs," says Dr. Crombie in his English grammar, p. 81. in every language, are those, the significance of which is the most extensive, and which would originally be of most general use, such as verbs denoting existence, possession, acting and being acted upon. Of this kind in our language, are the verbs to be, to do, to have."

We will take these, which this grammarians has cited, as examples to illustrate our theory. In the Great Indian language, *bhat*, is air, and *air* is the medium of existence; it gave birth to the verbs of being in most languages. Hence *bodhi* in Persian; *be* in Anglo-Saxon and English; *bha* in Greek, and the digaminated *vivo* in Latin, and *bheu* in Celtic. On the same principle the Hebrew *y* comes, *esir*, *light*, *air*, is the parent of our words *are*, *war*, and of the Latin *areus*, *corpus*. *To be* is to put with power to, and this, with other verbs of the same kind, are borrowed from abstract objects, as put forth their fruits, such as herbs, trees, the earth. Thus, *saw*, the graft, gave birth to *saw*, to produce. Hence such phrases as *saw* *saw*, to produce fruit; *saw*, is the oak; and hence *saw*, to bring forth as the oak; *seu*, the beech, hence *saw*, to yield fruit as the beech; *saw*, *saw*, means a flower; hence *saw* or *seu* to effloresce or flourish. In Chaldean *saw*, earth; hence in Greek *saw*, *saw*, and our verb *work*. In the same way *saw*, *saw*, to give, yield, is the real fource of the English *to do*.

Now, it is very evident that the principle which converted one of these nouns into a verb, is that which converts all other nouns into verbs. If this be the case, Dr. Crombie and other followers of Mr. Horne Tooke are mistaken, when they supposed that the junction of one of these verbs to a noun, caused that noun in courses of time to assume the character of a verb. And here we may observe that an infinitive verb, as separated from its agent or subject, is in reality an *abstractive noun*. In this state the preposition *to* is prefixed to it, and its use is to be ascertained from its etymology. In Arabic *saw* is a verb which signifies motion to a place or object. Hence in Celtic (a*te*, it) became a preposition denoting an *end*, or the point to which motion tended. In passing to Perian it dropped the initial vowel, and in the form of *ta* it denotes, in Perian, the interval in which motion reaches its object, or that object itself, and thus became the parent of our *to*, which it perfectly resembles in sound and sense. To then denotes that point of time or place to which motion or action tends, and in which it terminates; and prefixed to an infinitive verb, thus converted by abduction into a species of final nouns, holds it forth as the object to which the preceding verb is directed; thus, *I desire to learn*, I desire, and the object or end of that desire is learned, and the command which that command respects, is that I should tell you. This explanation appears valid, from the circumstance that when the infinitive verb is the immediate subject of action rather than a more remote object to which an action tends, the preposition *to* is dropped; as *I do plow*, *I* do the plough, or act the plough.

Let us not see what Mr. Tooke says on this subject.

"The preposition *to*," says he, vol. i. p. 350, "is the Gothic subjunctive *tanu*, or *tandu*, i.e. *ate*, *ate*, effect, result, conformation. Which Gothic subjunctive is, indeed, itself no other than the first participle *tandu*, or *tandu*, of the verb *tana*, *xere*. And what is done is terminated, ended, finished. After this derivation, it will not appear in the least miraculous or wonderful that we should, in a peculiar manner in English, prefix this same word *to* to the infinitive of our verbs. For the verbs in English not being dissingued, as in other languages, by a peculiar termination, and it being sometimes impossible to distinguish them by their place, when the old termination of the Anglo-Saxon verbs was dropped, this word *to*, i.e. *ate*, became necessary to be prefixed, in order to distinguish them from nouns, and to invest them with the verbal character. For there is no difference between the noun *love*, and the verb *to love*, but what must be comprised in the prefix *to*.

And he goes on, p. 355, "*Do*, the auxiliary verb, as it has been called, is derived from the same root, and is, indeed, the same word as *to*. The difference between a *be* and a *do* is so very small, that an etymologist knows by the practice of languages, and an anatomist by reason of that practice, that, in the derivation of words, it is scarce worth regarding. And, for the same reason that *be* is put before the infinitive, *do* used formerly to be put before such other parts of the verb which likewise were not dissingued from the noun by termination. As we still say—I do love, instead of I love. And I did, or did love, instead of I loved. But it is worth our while to observe, that if a dissinguing termination is used, then the dissinguing *do* or *did* must be omitted, the termination fulfilling its office. And, therefore, we never find—I did loved, or he did love. But I did love, be did love."

It is necessary briefly to expose what we conceive to be the fallacy and absurdity of this reasoning. *To*, in found and fence, is the farthest possible from the Gothic *tana*, which is only the Greek *saw*, to fabricate, the true origin of to being the Persian *tan*, which has precisely the same meaning with it. It is altogether unnecessary to prefix the *to*, in order to dissingue the verb from its corresponding noun, because this is done by the context, or the collocation of the verb; and what is most remarkable, when *to* is prefixed, the verb loses its verbal character, and becomes a noun by abstraction. That an infinitive verb has the nature of an abstract noun, is manifest from this. In all languages we may be made the subject or object of discourse; and, in Greek, it is admitted in the article before it, as nouns do; and in all instances where
ever, an abstract noun, where such exists, may be signified for it. I dof, to learn, 1 to, to be learning. To excel in learning is honourable. So then, according to Mr. Tooke, it is put before a verb to distinguish it as a verb when it has ceased to be a verb—when, from a verb, it becomes a noun. And the reason why we say he doth love, instead of he doth loves, is not that the termination supplies the place of to, but because loves and love are one a verb, the other a noun, which last does not admit such a termination.

The conception of to into do, as to become a verbal index, is a concept of this writer, equally unwarantable. Do, as we have shown, is the identical Latin do, to give, to place, to produce, or put forth, where it has such meaning, in the following phrase—do euram, to put forth euram, i.e. to exert, endeavour. And yet Mr. Tooke has been followed and supported by all subsequent grammarians in the above incorrect and inconclusive reasoning. "The form," says Dr. Cromer, p. 83, of the infinitive to loves, doubles, the same as to love, thus denoting the simple energy of the emotion, signified by the noun love, and t being kindred letters, and easily convertible. To love, therefore, means act love, do love, the word do or to involving the noun with a sort of verbal character. The infinitive, then, expresses simply the action or energy of that attribute which is denoted by the verb, uncompounded with the various accidents of mood, tense, number, and person. This last sentence is a full description of the infinitive mood which Dr. Lowth very properly calls the subjunctive mood; and it is a correct description of an abstract verbal noun. How then can to or do involve the noun with a sort of verbal character; when, if it be an index of any thing, it is an index of a verb changed into a noun? A respectable writer on grammar, in the New British Encyclopaedia, p. 31, following the track which Horne Tooke has pointed out, thus adds: "The infinitive mood, as it is commonly called, is the verb divulged of its peculiar force, viz. of affirmation, and uncompounded with the words which render it expressive of person, number, tense, and in the modern languages of time; but it seems erroneous to consider this as the fundamental form of the verb, where it has any distinguishing termination; it is then the noun flat of the word, with a termination added to it, to show that it is to be employed as a verb. Thus, in the Anglo-Saxon tean, the is the fundamental form of the verb, and an is the verbizing adjunct. Now, as the imperative form of the verb is nothing more or less than the simple verbal name, unattended with the inference of affirmation, this may be considered the fundamental form; and in the Latin in particular the variations of flexion are traced with the greatest advantage from this source."

It is curious to observe the contradictions and absurdities into which writers plunge themselves, when they have adopted erroneous opinions to account for the phenomena of language. Mr. Tooke, alluding to the ancient Storks, thanks the pure flat of the verb to be the infinitive, and yet agrees with his followers in making affirmation or affixion to be the efficacy of a verb. But it is allowed that a verb drops its affirmation in the infinitive; so that, according to this reasoning, a verb is in its pure flat when it has no efficacy. Again, the infinitive is here not improperly called the new flat, i.e. an abstract noun, with the prefix to in our tongue; but in the Anglo-Saxon with the affix an, to show that it is a verb; and as this is a new idea, an in a new language, is called the verbizing adjunct. But what evidence is there for saying that an performs this office? No evidence at all, but a false assumption. We have already said that the Gothic and Anglo-Saxon an is but the Greek infinitive an, or (in verbs in an), an, which is the same without the change of a letter. We have this further evidence of the derivation of the Northern language from the Greek, in this respect, that in this latter the imperative, instead of being the fundamental form of the verb, is, by corruption, derived from the infinitive. Thus, the was the old infinitive; the was also the imperative; but the final being, by degrees, dropped, it became . And it is remarkable, that in the Anglo-Saxon the imperative is derived from the infinitive, in the same manner precisely as the imperative is from the infinitive in Greek; and this correspondence, added to the identity of the termination, we deem a sufficient proof that the Northern, in this respect, is no other than the Greek tongue. The Latin imperative is borrowed from the Greek, as is evident on inspection— the verb, the verb.

The position, that the variations of flexion may be traced with advantage from the Latin imperative, is a fancy, which is contradicted by that broad analogy by which the Latin verbs are formed from the proteronic. It is worthy of remark, that the old Greek accords with the Hebrew, where the imperative is the same with the imperative, and succeeds it in the paradigm of verbs. We shall only, on this subject, express our surprise that if such sensible men were deceived by adopting the notions of Mr. Tooke, they were not repelled by what appears to us to be contradictions. This grammarians wholly that deliberate art had no concern in the formation of language: yet, in examining its phenomena, he recurs to minute mechanism and petty artificialities, which, as being unwilling to allow the agency of a rational law in the human mind, he calls the constrictions of language.

We now proceed to consider briefly the usual divisions of verbs into active, passive, and neuter; and this division of verbs we pronounce to be extremely unphilosophical. And first, as the expression of active qualities is essential to verbs, there is no such thing as a neuter verb. There are, indeed, verbs which denote off, or the cessation of motion; but we cannot use these without connecting with them positive ideas; and as action is necessary to destroy or support action, we can resolve all apparent neuter into active verbs. Thus to flound, is to cause to flound, to flound, is to enjoy repose; to sit in to hold one's feet. Secondly, the division of verbs into active and passive, though convenient in some languages, is incorrect and even absurd in our own tongue. For all active verbs imply passion; while all passive verbs on the other hand, imply action. Hence the one may assume the form of the other without altering its nature. Thus, he aman parents, he loves his parents, is the same in French as parents amant ab ilis, his parents are loved by him. The only difference is that, in the first instance, the agent is nominative, and the object accusative; in the second, the object, becoming the subject of the verb, is put in the nominative, and the agent in the ablative. An agent, while it acts, is acted upon. Every active verb, therefore, has the compound tense of active and passive. Thus, in the above sentence, he loves his parents, the first part, he loves, is active; the hall, he loves his parents, is passive. In the same sentence, converted into the passive form, his parents are loved him: the first part is passive, and the hall active. In the minuteness of language, the distinction of active and passive was in all probability not known. In Hebrew, the difference but imperfectly exists, and in the early periods of it probably did not exist at all. In Arabic, the only distinction which obtains, arises from the vowel points; a late invention, compared with the antiquity of that language. And in our own tongue the names of active and passive would have been unknown, if they had not been imported from the Greek and Latin.
GRAMMAR.

Latin grammars. In English the passive form of the verb is expressed by the connecting verb to be, and the perfect participle; and in converting an active into a passive proposition, we need only change the verb to its perfect participle, and append it to the connecting verb in the same mood and tense, and annexing the agent with its correspondent proposition in the ablative case. Thus, we worship God, because God is worshipped by us. Hence it appears that verbs which are transitively active can be made passive, because they have an object, which, in the passive form, is made the subject of dative case; and that verbs intrinsically active cannot have a passive form, because they have no object.

The passive voice, in all languages, is expressed by the connecting verb, and the perfect participle for its predicate; and it is curious to observe, that this combination is its origin in the Greek tongue, the subject of dative case being combined with the personal pronoun in the dative case. Thus, *κατεστάρασε καθότερον τοίμησεν*, which do not, as before, clothe an agent with a subject, but as a subject with the perfect to whom it belongs, and for whom it was intended. Hence their combination came to convey the idea *I am bowed*. I am built; for the auxiliary am serves only to assert that bowed or built belongs to the proposition preceding it, and to cement their union in the mind as subject and predicate. In the same manner, if *κατεστάρασε καθότερον τοίμησεν* be annexed to the word *κατεστάρασε*, we have *κατεστάρασε καθότερον τοίμησεν* for thee, bowed for him. And these contractions, by slight changes, became *κατεστάρασε καθότερον τοίμησεν*, I am built, thou art built, he is built.

A verb, if its operation passes over to another thing, or if it have an object to express the effect of that operation, may be called transitive; but if its influence do not pass over, or if it have no object, it is intransitive. Verbs, on the other hand, not expressing action, but being, stand, stand, and serving to associate two things, as a subject and predicate, may with propriety be called connecting verbs. Of this class is am, with all its branches, or the corresponding verbs in Latin and Greek. And here it is proper to observe that verbs of motion came in all languages to signify continuance, purpose, and the like, because we can measure duration, or even effort, and privation of motion, only by ideas consequent on motion. Thus, in our own tongues, a diligent boy will become a learned man. *By thee dispatched into congenial soil, finds each attractive plant*; *i. e. is dispatched*. So in Latin, *Quum placidum ventis functem maris*, when the sea flood in the past continued, tranquillized from the winds. Veneti lenior, the will come milder, *i. e. will be or become milder*. Vixisset flamandibus vas, he would have lived, *i. e. he would have been a filthy pig*. Ego meco regina, I walk a queen, *i. e. I am a queen*. Theorurum, speaking of the irascibility of Pan, writes *κατέσταρασε καθότερον τοίμησεν*; *i. e. is intimated*. Keen anger always fits in his nose. *i. e. the breath of anger always continues in his nostrils, or, he is ever irascible*. On this principle it is that *οὖ* in Greek, as implying continuance or purpose, came to have the fene of *am*— *καθότερον*, I am well; and that *οὖ* in Latin, I am and *οὖ* I go, were originally the same language.

And in Latin *esse* became, for a similar reason, into *cerno*, which occurs in Lucianus in the sense of *see*. From *esse* the Italians have derived *vedere*, to go out, end, and *vedere*, exist; a door, or entrance. Hence we have derived to *yer* the Italian *lato*, *essen* owes its derivation from *flö*, to the same mode of thinking. All verbs then, are either transitive or intransitive, or connecting verbs. And this division appears to us obvious, useful, and philosophical.

The properties of verbs are mood, tense, number, and person. On these properties, as they are discussed in all grammars, (see L. Murray's valuable Grammar of the English Tongue; Dr. Crompton on Etymology and Syntax; Dr. Priestley's Philosophical Grammar, and particularly Mr. Pickburn's excellent Dissertation on the English Verbs,) we shall content ourselves with a few observations. Mr. Tooke, vol. ii 472, says that mood, tense, number and person are no parts of the verb. But this opinion will appear to be erroneous, if we reflect on the manner in which verbs are derived from nouns. For the personal pronouns in each number enter into the composition of a verb in the ancient languages, where it is distinguished by personal termination; though we acknowledge the affixion to be just in English, where the verb is known only from the annexed pronoun, or its connection with the agent and object. Again, if we reflect on a verb in its formation, we perceive it to contain an idea, the result of observation and experience, which, as well as certain, absolute, and unconditional. This certain, absolute, and unconditional form is essential to the verb, and it constitutes that *made or unmade* called the indicative mood. As the indicative mood respects the past time, to the subjunctive, in respect to it, regards the future. And in all future events, at least with respect to man, are uncertain, relative, and conditional. All verbs, expressing an uncertain, relative, or conditional, uses, are in the indicative mood, so called from its being *foliowied* to a verb in the indicative mood. All verbs, moreover, expressing an *end* or *intention* as being from their nature uncertain, are used in the subjunctive mood, and for this reason it might be called the *final mood*. In this view it has a close affinity to the *infinite*, which, as we have already observed, is only an abstract noun with the proposition to be, denoting the end or object to which the preceding verb is directed. Accordingly, they may be subordinated one for the other, in all instances. Thus, *I desire to learn*, I desire the object of my desire being learned; *I desire that I should learn*, I desire, that being my end, I should learn. Hence it follows that the subjunctive mood is not essential to language, and for this reason it does not exist in Hebrew and some other tongues. As a command is necessarily given in the time now, the imperative has no tense but the present, nor can it, in strict propriety, have a first person, singular or plural; because it would be absurd in a preten to command himself. Let me love, then, is not the first but the second person, as may appear by substituting for its equivalent *let Perin* thou me to love.

Finally, if we reflect on the verb in its element, we shall find that *time past* is essential to it, because the conversion of a noun and the annexed pronoun into a verb is in consequence of past experience or observation. But as present facing or consciousness coalesces with our reflection on the past, the verb, which owes its existence to the past, comes to signify also the present. And this is the reason why in Hebrew, the most ancient language, the same form of the verb expresses the past and the present time; and this, too, appears to be the reason why in English and all other languages a verb in the present tense is used, in an extended sense, to comprehend all time, present and past. As, *the sun rise every day*; *birds fly*; *truth is always true*. In these and similar instances no reference is made to the future; unlike the future, by association, inessential in our minds coalesces with the past. But men soon became sensible of the necessity of limiting the verb in regard to time. They soon acquired a distinct notion of the three divisions of time into present, past, and future; and in order to vary the terminations of the verb, so as to correspond to these divisions, nothing more was necessary than to follow the impulse of association acting on accidental corruptions. Hence the origin of tenses, which, as the word implies, are the extenion of the verb by distinguishing terminations to express the divisions of time. And here we cannot help observing, how improper it is to call tenses
and similar contrivances, abbreviations, (as is done by Mr. Tooke,) a name, the very reverse of what a tenet purports to be. The formation of the tenets in Hebrew is worthy of attention, and shews that the human mind, under the influence of a rational law, without perhaps the express exertion of reason, may produce a contrivance for its beauty and simplicity truly admirable. In that language the distinguishing termination is the personal pronoun, annexed or prefixed. Now, suppose ָּ, a fragment of the first personal pronoun, to mean I. It will also become a natural index of the time now, whenever the speaker uses it in connection with a verb, because he measures the present moment by the use of it, or by reflecting on himself when using it. This being the case, a verb preceding ָּ will be a past verb, by pointing, as it were, the attention backward, as Pegasus, visited I, or I visited; while a verb succeeding the same particle expresses the future time: the pronoun, being the index of the present time, points now the attention forward, as ָּ, meaning I will visit.

But for ָּ, the other fragment of the personal pronoun, is used ָּ. In modern languages, which have no distinguishing terminations, the notification of time future is but an inference drawn from verbs of volition or desire, in consequence of the constant association of the object of that volition or desire with time to come: as I will learn, which meant, at first, I am resolved to learn, and then the time when the resolution is to be performed. Thus ָּ and ָּ, which are the Hebrew ָּ, ָּ, and the Greek ָּ, ָּ, is in a secondary sense becomes indices of time to come. It is here of importance to remark, that though ָּ, ָּ, with ָּ, ָּ, and, are called auxiliaries, they are still leading verbs, and govern theo, which they are supposed to subserve, in the indicative mood.

The Greek has been represented as very like the Sanskrit; but in truth, the old Æolic dialect, whence the Latin is derived, claims a much closer affinity with the great Indian language, and in that dialect of it which is spoken in Bengal, the mark of the future tense is ָּ. Thus ָּ, I shall be, is the future of ָּ; but so is the Latin ָּ, the future of ָּ; ָּ being originally ָּ, a form of the verb denoting conjunctive, and hence expository, or transition in regard to time. Mr. Tooke, indeed, in his usual manner, supposes ָּ to be an abbreviation of ָּ, ָּ, ָּ, see vol. ii. 433. But the primary sense of ָּ is to ָּ, or deliberate; and upon the same principle that this verb became an index of future time, any other verb or form of a verb would be made an index of it by associating its object with futurity. The ideas which this graminarian had of language are altogether mechanical; and by rejecting the principle of mind, while continually hunting after blind mechanism, he forced us to see that he had fulfilled the character of a philosopher in explaining its phenomena.

The Origin and Properties of Participles.

Mr. Harris's account of participles is as follows: Every complete verb is expressive of an attribute of time, and of an affront. Now if we take away the affront, and thus destroy the verb, there will remain the attribute and the time, which make the essence of a participle, p. 184. This statement has conciseness and simplicity to recommend it, though we do not regard it as correct. Mr. Tooke gives us the following account of participles. "This sort of word is by no means the same with a noun adjective. The participle has all that a noun adjective has; and for the same reason, verbs for the purpose of adverb. But it has likewise something more than a noun adjective has; because the verb has something more than the noun. And that something more (as Perizonius proceeds to assert) is not only the adsignification of time, for every verb has a significational distinct from manner and time. And language has as much occasion to adjective the distinct significational of the verb, and to adjective also the mood, as it has to adjective the time. And it has, therefore, adjectives all three—the distinct significational of the simple verb, and the verb with its moods, and the verb with its tenes. I shall at present notice only the verb adjectives, which we now employ in English, viz. the simple verb, itself adjective; two adjective tenes, and three adjective moods.

We had formerly in English only the simple verb-adjective, and the past tenes adjective. In addition to these two, we have now the convenience of four others, which I must call the potential mood active adjective; the potential mood passive adjective; the official mood passive adjective; and the future tenes active adjective. As the noun adjective always signifies all that the unadjectined noun signifies, and no more, except the circumstances of adjection; so must the verb adjectives signify all that the unadjectined verb signifies, and no more, except the circumstance of adjection. But it has been usual to suppose, that with the indicative mood, as it is called, is conjoined also the signification of the present time, and, therefore, to call it the indicative mood present tense. And if it were so, then indeed the word we are considering, besides the signification of the verb, must likewise adsignify some manner and the present time; for it would be then the present tense adjective as well as the indicative mood adjective. But I deny it to be either. I deny that the present time, or any time, or any manner, is signified by that which is called improperly the indicative mood present tense. And, therefore, its proper name is merely the verb—indicative, if you please, i.e. indicative of being merely a verb."

Our readers, we are sure, will not be able to peruse this account without surmise; and we shall endeavour to set it aside by a more simple and rational account of the participle. The present participle denotes the operation of a verb without regard to any agent; the perfect participle denotes the state, power, or habit, generated by that operation in a person or thing which is the object of it. If this statement be just, the participle in its genuine state is rather a verbal noun than a verbal adjective, and has a close affinity to the infinitive mood. Hence, we can account for the origin and use of the participle. The Hebrew, and more especially the Arabic, form their verbal nouns by what is called naming, or the syllable or added to the verb; and this is the Greek participle in, which the Latins have converted into ens; but which we, by giving n a nasal sound, have corrupted into ing.

As the participle is a verbal noun, we see the reason why in all languages it is either used as a noun, or gives birth to various classes of abstract nouns. The present participle, as expressing an operation, naturally coalesces with an agent, and this is the reason why in Hebrew, in Greek, and sometimes in Latin, it denotes a deed, or a person who acts; as ἡ χρήσις, he was writing, the writer; amans, he loving, the lover. From its facility to coalesce with a noun, the participle loses its nominal character, and becomes an adjective; and as it denotes an active quality, or a power in energy, it forms, with the connecting verb to be, the three active compound tenes—I am writing—he was writing—they shall be writing.

Further, as all operations are in time, and we acquire the idea of time present by reflecting on successive operations, the present participle implies time unlimited, and in its affi-
cited effect time present, i.e. time present, not absolute, but relative. Thus, I am writing, i.e. I am now writing; I was writing, i.e. I was writing at the time then present.

And, in general, the participle is derived by the concomitant verb in the sentence which may be either present, past, or future. If the verb be past, it marks the past time as then present; if future, it marks the future as hereafter present. And thus is rephrased the opinion of Mr. Tooke, that there is no adfiguration of time in the present participle. But as he may pronounce this argument a mere eviotion, I will illustrate it by a parallel instance in Greek. The subjunctive verb πασχέω, νικάω, &c. is thought to be the present tense; but it is really the future tense, and this is proved by its signification as well as by analogy, for in all instances this expresses a future time, not indeed absolutely so, but future in regard to another verb connected with it in the sentence. For example, "If they told him, leaving, if it be lawful to heal on the sabbath-day, that they might accuse him," ἐπεστηκα, πασχάω, νικάω. To accuse him was their end in asking, and in regard to that act was future, though now long past. Finally, things which act in consequence of actions are designated by a participle to act, just as bodies when moved have a tendency to move. Repetition, moreover, imports to the acting quality additional strength, protestion, and permanence. To express it with the propriety and vigour thus attained by use the participial termination, as in Greek is added to a noun or to an adjective, which, as receiving an additional meaning, is called an augmentative. Thus, ἐπεστηκα, speaking, means also one who is prone to speak, which is the character of the scoler or diffembarer; ἐπανεστηκα, deceiving, one given to deception, a great deceiver; κατακλαμνα, κατακλαμνα, more so, excessive in so-called. And from this the Italians have derived one way of qualifying their nouns. Hence, our falcon, (a great half), balloon, and, perhaps, policeman, the augmentative of paltry.

The perfect, or past participle, is certainly derived, as Mr. Tooke represents, from the past tense.—Amavit, amatus; amatorius; amatorius—decinit, decinitus; dictor, dictus; legitus, legitus, legitus; legis numeri; additus, additus, additus; orbis, which is the Greek ἱεραρχός, is added to the third person as the analogical termination of nouns, to show that the verb is not abstracted into a verbal noun, denoting the effect of the action. Accordingly amatus, dictor, legitus, additus, and the like, are every one either abstract nouns of the fourth declension, or verbal adjectives coalescing with another noun. And here we shall quote a passage from the Encyclopaedia Britannica, (p. 86.) to show into what errors grammarians have fallen, by not having attended to the nominal character of the participle: "From these observations and examples," says the writer, "we shall be able to understand the uses of the adjectives. It is either employed to signify or modify a general term; or the abstract substantive contained in the adjective is modified by the noun with which, in the concrete or substantive form, that substantive is conjunctive. The first may be called the direct, the second the inverse acceptance of the adjectives. Livy, speaking of the abolition of the regal authority at Rome, says; "Regnum visitam et clementiam et literatum annos ducentos quadraginta quadruor," Monarchy subverted at Rome, not from the city built (which would convey no meaning,) but from the building of the city, to its deliverance. Both the participles clementia and literatum are here used inversely, i.e. the abstract substantives contained in clementia and literatum are modified and restricted by the substantives urbe and urbem, with which they unite. Again, Ovid, speaking of the contest between Ajax and Ulysses for the arms of Achilles, has these lines:

"Qui licet eloquio fidum quoque Nestor invenit
Haud tamem efficaci dejectum ut Nestor crimen
Nullam esse robor."  

Here also the adjective or participle dejectum is taken inversely, and the general notion of dejectum contained in it is modified or rendered particular, by being joined with the substantive Nestor. The meaning of the passage is, "I will never be induced to believe, that the dejection of Nestor was not a crime."

Were dejectum to be taken directly as an adjective, modifying its substantive, the sentence must be translated, "I cannot believe that Nestor dejected was not a crime." But it is evident that this is nonsense; as Nestor, whether dejected or not dejected, could not be a crime."

This writer was led by Mr. H. Tooke to consider every adjective as a noun in its nature; he then makes a discovery in which he seemingly blames himself, which is this; instead of the adjective qualifying its noun, the noun inversely qualifies its adjective! This able writer would not have used this language, if he had trusted to his own understanding, and had not allowed himself to be misled by his guide. The participles condita and literata, though they here coalesce with another noun, still retain their original character of a substantive, and the historian has apprized his readers of this character by the collocation, where condita is rendered prominent and emphatic by succeeding the qualified uke. The same observation applies to dejectum Nestor, which is equivalent to dejectum Nestoris.

As the past participle expresses the effect of an operation, it has been called the pastive participle; but when the subject of an operation is a moral agent, that effect is held, or a voluntary principle of action. And thus it is, that the perfect participle often expresses or implies action; as, admiriatus, having admired; locatus, having spoken. Sometimes in Greek and Latin it conveys a reflex sense; as ferox membra, having provoked his limbs; πιστίς ἁρκας, havingEffects from me. And lastly, as the perfect participle is derived from a past verb, and, as it signifies an effect already produced, it points to time past; nevertheless, that effect is a habit or power capable of action, it implies time present, and thus the past participle, comprehending both times, answers to the denomination of perfect past.

The Origin and Properties of Prepositions.

Mr. Harris defines a preposition to be a part of speech, devoid itself of signification, but so formed, as to unite two words that are significant, and refine to coalesce or unite of themselves. This definition is undoubtedly erroneous, and has been justly censured by Mr. H. Tooke. We venture, however, to affirm, that the account given by the last-mentioned writer, is by no means such as a philosopher, who accurately understood his subject, would give of prepositions. "As the necessity, says he, vol. i. p. 319. of the article, or of some equivalent, follows from the impossibility of having in language a distinct name or particular term for each particular individual idea; so does the necessity of the preposition, (or of some equivalent invention) follow from the impossibility of having in language a distinct complex term for each different collection of ideas, which we may have occasion to put together in discourse. The addition of a substanative of any one idea, to a collection, makes it a different collection; and if there were degrees in the collection of ideas, it is still more impossible to use in language a different and distinct complex term for each different and distinct collection of ideas, than it is to use a distinct particular term for each particular and individual idea. To supply, therefore, the place of the complex terms which are wanting in a language, is the preposition employment.
ed, by whose aid complex terms are prevented from being infinite or too numerous, and are used only for those collections of ideas which we most frequently occasion to mention in discourse. And this is obtained in the most simple manner in the world. For having occasion, in communication, to mention a collection of ideas, for which there is no one single complex term in the language, we either take that complex term which includes the greatest number, though not all of the ideas we would communicate, or else we take that complex term which includes all, and the fewest more than those we would communicate; and then, by the help of the preposition, we either make up the deficiency in the one case, or retrace the superfluity in the other. For instance, "A house with a party wall," "A house without a party wall." In the first instance, the complex term is deficient. The preposition directs to add what is wanting. In the second instance, the complex term is redundant. The preposition directs to take away what is wanting."

Now this statement appears to us to be more properly descriptive of conjunctions than of prepositions; it being made altogether in reference to with, which has, in the above instance, only a conjunctive use; as, a house and a party wall, i.e., a house with a party wall, or, Mr. Tooke explains, with a house of a party wall. The following we deem a more just representation. Prepositions express the relations of things; and, as our ideas of relations are affected effects, arising from our ideas of things, so the words expressing relations are borrowed from the things related, that is, prepositions originate in nouns and verbs. But we have seen, that the relations of things are also expressed by prepositions. Cafes, therefore, and prepositions, have the same meaning; the former, indeed, being no other than the latter combining with nouns, and thus giving them different terminations, bearing distinct forms. The three leading relations we have farther seen expressed by cases, are beginnings, inferior or medium, and end. Tho' prepositions, then, which signify beginning, require the noun preceding them to be in the original state or position, or, agreeable to the usual language, govern the genitive case. Those signifying inferior or medium govern their dependent nouns in the instrumental or modal, or, as it is commonly called, the object case; while those denoting the object or end to which an action or motion relates, to which it tends, and in which it terminates, have their governed nouns in the final or dative case.

We now proceed to ascertain the meaning of the leading prepositions, by deducing them from their origin. And we shall find that Mr. Tooke, as his ideas are unsatisfactory and unapparent in regard to the use of prepositions, is mistaken in almost every instance, in respect to the forces in which they originated. And here we must premise, that our ideas of beginning, medium, and end, are so palpable and distinct, and so essential to distinctness in our other conceptions, that they are nearly coeval with our ideas of things and of motions; and consequently must have existed in the language of men, as soon as it reached a form deriving of that name. And as we maintain, that all the varieties of human speech which now exist, or have ever existed, are but branches propagated by various causes, (like the human race itself,) from a few parental stems in the one primeval language of mankind; so we maintain, that most prepositions in different languages, are but the same original words, differently corrupted, agreeable to the genius of the people who borrowed them from their ancestors; and that the English prepositions, in particular, are antecedent to Anglo-Saxon and Gothic corruption, or, as Mr. Tooke would say, abbreviations, and originated in oriental words, derived in many instances through the medium of Greek and Latin. The derivation of the conjunctions and prepositions is, indeed, the most specious part of Mr. Tooke's system; and not only in his own opinion, but in the opinion of the public, he lies so strongly fortified, that no adversary can disprove him. We shall, however, make an attempt for this purpose.

"I imagine, says he, p. 367, that of (in the Gothic and Anglo-Saxon after or on,) is a fragment of the Gothic and Anglo-Saxon ofa or ona, purpose, aiming, that it is a noun substantive, and always meaning purposes, offering, succour, or follower." Now as to offer it is nothing but the Greek ἑκάστος, produce, from ἑκατόν, and the meaning of of is quite therewith of confunde, &c. Thus, in the plural, rays of the sun, points to the sun as the origin of rays. It means, therefore, a source, origin, and its derivation is ἑκάστος, ab. root, stem, etc., etc. The genitive case, which corresponds to of, further proves this, ἑκάστος ὀφθαλμος, where if, annexed to end, surely does not mean that the sun is a confederation of the rays, but that it is the origin of the rays. The source or cause of a thing is before that thing in the order of nature. Hence, according to the usual arrangement in Latin, the noun in the genitive case, as sun, can never be followed by a preposition. But if a preposition is annexed to it, as, from, it is always with, with the sun, the sun from this, and this is the reason why in English we always say father's house, (father is house,) and never house father's, having copied not only the genitive termination of the third declension, but also the collection of the noun affected by it. Moreover, not of but after came from the Gothic of after, because this, meaning offering, came also to denote successor, or that which comes after those who gave it birth. And in the Gothic it is used as a preposition signifying poff, after, where the t is introduced to humour the pronunciation, as δ is inserted in udo, for uo, or uo.

As of begins, it has the same sense with from, which Mr. Tooke derives from the Gothic and Anglo-Saxon from, meaning follow, beginning. This may be admitted. But whence did from originate? The Latin, it is well known, converted the Greek termination into m. Thus the accusative a became in or m; the genitive plural ess, etc., and the neuter ending ess, is also in Latin. On this principle m, is the parent of primus. This laid the Gothic of Wallachia, where, as Michaelis observes, a Latin colony had been established, and whole language, after this blending with the Latin, is the only specimen of the Gothic preserved in modern days, have borrowed and corrupted in the form of from, which retains the original sense of in, without. But we are not yet arrived at the origin of the word. The Arabic ٍ, p. 40, among other meanings, denotes the head of a family, which being rendered more general and abstract, gave birth to the Greek πρός, πρός, to the Latin præ, to frum in the Icelandic, Norfe, Danimith, Swedish, to se in Fretich, and from in Scottish. And thus the Arabic origin of the word accounts for the different forms of from, frum, fies, frum, in the Northern dialects, the first being derived through the medium of Greek and Latin; the others immediately from Ain. Mr. Tooke happens to be right in the meaning of from, merely because the Gothic corruption of frum has correctly retained the original sense of primus. He thus illustrates it signification. Figs came from Turkey; lamp falls from ciling; lamp hangs from ciling. Figs came, beginning Turkey, that is, Turkey the place of beginning to come. Lamp falls, beginning ciling; ciling the place of beginning to fall. Lamp hangs, beginning ceiling; ceiling the place of beginning to hang. This explanation is rational and just; but when he adds comes is a complex term for one species of motion; falls is a complex term for another species of motion; hangs is a complex term for a species of attachment, though very true, this is nothing to the purpose. Come, falls, hangs imply each motion or direction,
direction, and from points to the origin of the motion or direction in each, without any reference whatever to their peculiar meaning.

To the prepositions of and from, alludes the, till, and for. Mr. Tooke, in the latter, with equal propriety, does it from his own name, apply it from the Gothic tynos, to act, which is but the Greek ἀπό, to fabricate. Equally absurd is it to say that the Latin ad is from ambum. The parent word, as we have seen, is the Arabic نِن: نِن, to move to a thing. In Celtic, the word has preserved its original form (atta) in the exact sense of to. But in Persian, losing the initial vowel, it became taa; whereas, in Latin, retaining the first and dropping the last, it exists under the form of ad, and in English under that of at. To and at have a signification corresponding to their kindred origin, the former denoting the object of motion, and the latter coalescence with that object after its reaching it. “That till should be opposed to from, says he, only when we are talking of time, and upon no other occasion, is evident for this reason, viz. that till is a word compounded of to and while, i.e. time. And yet, for the life of me, I can discover no signification of these two words, while, took place in the language long before the present wanton and superfluous use of the article the, which, by the prevailing custom of modern speech, is now interpolated. So that when we say, “From morn till night,” it is no more than if we said, “From morn to time night.” When we say, “From morn to night,” the word time is omitted as unnecessary. So we might say, “From Turkey to the place called England, or to place England,” p. 365. But while, or, as it is in the Anglo-Saxon, beo, does not mean time but a period, or revolution of time, such as a day, week, &c. and is derived from the Hebrew תב, sunt, or geel, to revolve, and year, or, as our ancestors spelled it, gear, is derived from תב, sunt, or in Greek γείς. The Hungarian geel is also the parent of our sneak. To points to a final object either in place or time, while, in strict propriety, is applied to time only, and is derived from velo, to rise, and was at first expressive of the rising sun. Thus, “I will wait till morning,” i.e. I will wait the rising sun. As till denotes time, rising, or alternation of time, the word is always understood to be followed by some change implied in the context, but never expressed; thus, “We are always infinable of a bleeding, till (or until) we lose it,” then “we are infinable of it,” is a change implied. They will stay till morning; and they will then depart, is to be understood. Till exists in the Cymric language, and this is an additional proof, that the uncouth compound to sneak is a mere fiction of Mr. Tooke.

Mr. Tooke takes for to signify cause, as opposed to of, signifying consequence, from the Gothic subjunctive forma, a cause, p. 367. He thus illustrates them, I am sick of my husband, and for my gallant. Love makes her sick of and sick for. Here of and for seem almost placed in opposition. At least their effects in the sentence are most evidently different. With the help of these two prepositions alone, and without the affinities of any other words, the expresses the two contrary affections of loving and desiring. Her gallant was the offspring of her husband, proceeded from her husband. Her gallant was the cause of her love. But if her gallant proceeded from her husband, he was the cause of her gallant: and of and for, instead of being opposed to each other, as they certainly are, mean just the same thing, namely, cause, and not cause and consequence. But in truth, the matter is just the reverse of what our grammarians represent. Of means cause or origin, and for means consequence or end. She is sick of her husband—he is sick, her husband is the source of—she is sick for her gallant, and the object to which he looks with desire is her gallant. Accordingly, for always supposes the attention not directed backward, as to the cause, but forwards, as to some end; and its etymology is this, περι, to pass over, περιο, or per, the medium of passing to an object; the French pour, for, the object or end to which passage is made. Johnson gives for forty-five different meanings. But there is not one instance in which it does not bear a final describable from its primary signification of end or object. Thus, Christ died for us; Christ did us (i.e. our redemption) being the end or object of his death. To fight for the public good—fight, the public good being the end or object of fighting. He does all things for the love of virtue. He does all things, the love of virtue being the end or motive of all his actions, and to in all other instances.

By (in the Anglo-Saxon bia, be, big) is the imperative of byld of the Anglo-Saxon verb bread, to be. And our ancestors wrote it indifferently be or by. So then, according to this, our auxiliary be and the preposition by are of the same origin and what analogy in the name of common feasts is there between them, excepting the accidental resemblance of sound. Let us apply this etymology to the solution of some cases. "He was slain by the sword," i.e. he was slain be a sword, or, "Let a sword be." We might ask let a sword be what? Mr. Tooke has anticipated the question by saying this preposition is frequently, but not always, used with an abbreviation of construction: subauditor, instrument, cause, agent, &c. Really it appears to us surprising, that a man of taste and understanding should write thus. In Hebrew אָב, ba, is to pass, and is the parent of θαι in Greek. In Arabic and Persian it became a preposition, signifying the medium of motion. In this sense it gave birth also to the Latin via and to the English way, by, and also to the Anglo-Saxon preposition bi or be, and the English by, which was used by our old writers to signify the interval of time during which motion is continued; as, “By fo long a time,” i.e. for so long a time—By his life, i.e. during his life.

Then it came to signify the medium or instrument by which any action in general was performed. He was slain by the sword—He was slain, the sword being the medium or instrument of his slaughter. The derivation of with from wychan is no less absurd. What has with to do with wych, or, as we have it, were? The parent of this verb, which signifies to with, is the Hebrew יָכָה, wychan, light, air, the medium of existence. The Greek μέτα, denoting connection, connexion, instrumentality, has passed into the Anglo-Saxon in the form of mid, where it is corrupted into with, and exists in the same sense in both forms. The letters m, v, w, are of the same origin, and often change one for another. Many Greek words are borrowed from the Hebrew, by changing μ into β, as παντίν, μαθάν, is βαςονιν, to rule; and all the Welsh words borrowed from Latin have or corrupted into wy, arma arw; more wcr; me wo. Inflections of this species of corruption occur in Anglo-Saxon and Gothic. Thus, the Gothic wids is the Greek μέτα; and hence the Anglo-Saxon, and the English ear. Even wychan, from which Mr. Tooke also derives with, is only the Latin mittus, to send, to put. And not wychan, as he says, but γυνίς signifies to join or put together.

“"The English preposition through, says our author, is no other than the Gothic subjunctive durch, or the Teutonic subjunctive durub, and like them means derv, get, passage, p. 334.” And he adds in the next passage, “After having been in what manner the subjunctive bowe became a preposition in the French, you will not wonder to see derv become a preposition in the English; and though in the first instance it was more exy for you to see the nature of the French bowe, because having no preposition corresponding to it in English; yet I am persuaded you will not charge this to me as a fanciful
tactical or far-fetched etymology, when I have placed before you at one view the words employed to dignify the fame idea in those languages to which our's has the nearest affinity."

After doing this, he adds, "Though it is not in Asia or its confines that we are to seek for the origin of this part of our language, yet is it worth noticing here, that the Greek, to which the Gothic has in many particulars a considerable resemblance, employs the word αυτος for "door." All this is very exquisite, and being confidently advanced, it has the air of truth, though it be misrepresentation. The preposition through exists, as Mr. Tooke has shown, in all the collateral languages; and it may be observed, what he has not, that there is a guttural annexed to the word in all. Thus in English through, Anglo-Saxon thurh or thurh, Gothic thurh, German durch, Teutonic durar or durub, &c. This uniformity in retaining a guttural, shows that a guttural was an original part of the word. And it is no other than the Hebrew י"ע, dark, road, passage, which has given birth not only to this preposition, but to a multitude of other words in all languages.

He came through Greece, he came, Greece being the road, a passage of his coming. The genial fun warms through the air; the genial fun warms; the medium or passage by which it does this, is the air. We shall only add on this subject, that the prepositions over, above, beneath, exist in the Arabic, with little or no variation, and in the same sense; while among is the Persian معین, in the middle, the name with the Celtic mecen.

In the Hindoostanic it is founded with a nasal guttural, as if written meng, and by the same analogy that mid became amid; bee, above; bow, about; meng became among. The corresponding word in Hebrew is י"ע, bin or ben, which means separation, distinction, an idea the very reverse of that contained in megar, to mix, from which Mr. Tooke derives it. From signifying separation, it came to signify the interval between two things separated, and hence the Hebrew bin (or written with the vocalization bin) is the parent of the Anglo-Saxon between, between, within. The Greek μετεξαιρε, to overturn, is in Latin revert, to turn, which the Anglo-Saxons have further corrupted into rcover-an, to turn to. Hence, in the form of cound it came to signify the object to which the attention is directed; as estegserd, i.e. cast up. We add only the etymology of over, Anglo-Saxon ofer; Greek εικος; Hebrew י"ע, ober, to pass over.

"We have already observed, that Mr. Tooke's description of the nature and use of prepositions belongs more properly to the conjunctions. But we ought rather to lay it down that it belongs to neither. Prepositions express the relation of things, and those relations are the same, whether things or the complex names of things are few or many; and the necessity of prepositions arises not from the impossibility of having a distinct complex term for each different collection of ideas, but from the necessity of those ideas we have of things and their operations. It is therefore utterly erroneous to say, that the preposition is employed to supply the place of complex terms. On the other hand, the conjunctions serve to propede or to compare our ideas, to combine or to separate them; and this use is entirely independent of the number or variety of complex terms. If the complex term of a language be few, they cannot be so few as not to need being separated; and if they be ever so numerous, they cannot be so numerous as not to need being joined in conjunction. Indeed what Mr. Tooke says on this subject is indistinct, inappropriate, and even nugatory; though some subsequent grammarians have gravely copied his reasoning as oracular wisdom.

The prepositions and conjunctions in English exist in the Anglo-Saxon and Gothic. But this circumstance Mr. Tooke has kept out of sight. He knew it would appear strange to&C. these words of this kind from verbs and nouns in the parent tongue, while the very same words existed in that tongue coeval, and in many infinities antecedent to the nouns and verbs represented to be their origin. But whence came those conjunctions and prepositions to the northern language? We have anticipated this question by proofs from fact. Those branches of the northern tongue, as the northern tongue itself, has done, originated in the oriental languages. The structure of those languages is such, that the verb is the leading part of speech, and not only the subjunctive parts, but even the noun is derived from it. This doctrine is inculcated and supported by the most extensive and obvious analogies, and taught in the popular grammar, so that no learner, who has made any progress in them, can be ignorant of the true origin whence these particles including adverbs, prepositions, and conjunctions, are derived. The verbs, from signifying in the Asiatic dialects the actions of things, degenerated to express the relations and connections of those things; and with some necessary variations incidental to sounds, passed into Greek, Latin, and other tongues, in the form of prepositions and conjunctions; and they were hence propagated, with still further corruptions, into the Gothic, Anglo-Saxon, and other European dialects. Losing much of their primary forms, and changed in signification, European grammarians soon considered them as distinct parts of speech. And much uncertainty, confusion, and obscurity, hung for ages on the subject, till Mr. Tooke rose and dismantled the mist, by ascertaining their true origin to be nouns and verbs. This he acknowledges, or rather boasts to have been a mere conjecture at first; and it has this singular fate, that, while the conjecture itself is perfectly just, almost every inference alleged to support it is erroneous and futile. Having no acquaintance with the oriental tongues, and seemingly little acquaintance with Greek and Latin, but endowed with a powerful mind, as we conceive, under some wrong bibles, and actuated by a desire of opening new paths of speculation, he boldly imputes the dignity of an ancient and independent language to oral corruptions, chiefly made by barbarous people, so late as the dark ages. On some of these corruptions he lays his hands, and holds them forth to the public as the parents of those words which long existed antecedently to those corruptions. This we believe to be a just representation of the question, and our readers will hence be able to appreciate the merits of his system. The following is the table of genealogy, which he gives of the leading conjunctions.

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<th>If</th>
<th>Gif</th>
<th>Gifan, to give</th>
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<tr>
<td>An</td>
<td>An</td>
<td>An-am, to grant</td>
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<td>Unleqs</td>
<td>Unleqs</td>
<td>Unleqan, to dispose</td>
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<td>Eke</td>
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<td>Yet</td>
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<td>Bitt</td>
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<td>And</td>
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We will briefly examine these. Skinner, before Mr. H. Tooke, has derived gif from the Anglo-Saxon gifan, dare; and perhaps this very word is the foundation of his theory, though he has not mentioned (and he may have forgotten) the circumstance which gave birth to his conjecture. It is, however, important to observe, that the use of gif as a preposition, is not of a late origin: for the Anglo-Saxons used it in that sense, and derived it in common with the verb gifan from the Hebrew, Arabic, and Persian word כפ, kaph, the palm
Now the action of the hand is two-fold, to give or to receive. In the latter sense it has passed into Latin, and produced capio, capi
ci, and even cabes, meaning to hold; in the former it has given birth to the Anglo-Saxon verb *Žj$, which signifies the action of the hand in imparting. Our word *keep* is apparently of the same origin, meaning to hold. Mr. Tooke observes, that *gin* is used in our Northern coun-
tries, and by the Scotch in the sense of *if*, and he justly says, that it is only a contraction of the participle green.

*An* used by old authors, means *if*, as in the following lines, quoted by Johnson:

"An honest mind and plain: he must speak truth An they will take it fo; if not, he’s plain."

That is, *if* they will take it so. This Mr. Tooke derives from *aan*, to grant, which is only the Latin *am***an*, to *affertain to*; whereas *an* is the Arabic particle; *N*, as, which is pronounced as if written *in*, when meaning *if*. We borrowed it from the Gothic, where it is employed, as it is also in Latin, to mark an interrogation. The derivation of *unlefs*, or, as it was formerly written, *olfs*, *on-lefs*, *of-lefs*, signifies at first sight not to be disputed. The application of the Anglo-Saxon *olfs* does not appear forced; *as*, Troy will be taken, *olfs* the palladium be preferred, *i.e.* Troy will be taken, *olfs* that the palladium be preferred, or, *olfs* that circumstances, namely, the preservation of the palladium, and Troy will be taken. And yet we are perfuaded that this is not the true interpretation of *unlefs*. Mr. Tooke is not fair in explaining the words from which he would derive this and other particles; but, in order to answer his own purpose, gives them a meaning which they really do not bear. *On-lefs* is interpreted by *ly*, *un-lefs* *le*, *un-lefs*, *fleves*, and it has no other meaning; and in this sense it is incapable of solving the difficulty. —"Troy will be taken, *unlefs* the palladium be preferred," which is hardly pereu. Mr. Tooke acknowledges that the Anglo-Saxon writers have not given us instances of *olfs* in a conjunctive sense: —"but, instead of it," adds he, "they frequently employ *nyme* or *nemhe*, which is evidently the imperative *nym* or *new* of *nymhe* or *neman*, to which is subjoined the, *i.e.* that; and *nyme*, take away that, may very well supply the place of *olfs* the, expressed or understood, *difmifs* that. But *nymhe* signifies not merely to take, but to take counsel, it being derived from the Greek *nymel*, to consult or deliberate; while the Latin *nomen* is named by *be*, by *rite*, by *rit*, *rity*, truly *lefs* is a security by law, and *ullfs* we conceive is a corruption of *unlefs*, *i.e.* unpreferred, unfeared. Thus, *Troy* will be taken, *ullfs* the palladium be preferred, *i.e.* it being unpro
duced, or it being not provided, that the palladium be preferred; or, provided that the palladium be not preferred, *Troy* will be taken. This author adds: *lefs* the imperative of *lefs*, which has the same meaning with *en-lefs*, is like
twife used by old writers instead of *ullfs*; as, "But will not bide there *lefs* yourself do bring him." To this he subjoins, in a note, p. 173, "It is this same imperative *lefs*, placed at the end of nouns, and coalescing with them, which has been given to our language such adjectives as *hoplefs*, *rifelfs*, *deathlefs*, *motionlefs*, &c. *i.e.* *difmifs* hope, red, death, motion." But *lefs*, we think, which, though not in a comparative form, conveys a comparative idea, is the offspring of the *lefs* *lefs* *lefs* (as little is of *tare*); both signifying small, ferner. From denoting something minute, it came, as the Latin *minus*, to express negation. On this principle, a *liefs*

ufual, though in time it came to convey absolutely a negative idea. *Hoplefs* without hope; *bottomlefs*, having no bottom; and we appeal to our readers, whether this explanation be not more simple and natural than *difmifs* the bottom. If this derivation be just, *lefs* or *lefs* is not the past participle *lef* *lefs*, to difmiss, but a contraction of *lefs*, the analogical imperfective of *lefs*, and it means the least degree of some con
cquence that follows the preceding clause; as, "Let those who fland take heed they fall," which means, let those who fland take heed; if not, they will fall, and that is the least that may happen.

*Els*, and, in the Latin *ar*, is ultimately derived from the Greek *ekso*, or as it is in Latin *auges*, to increase, though it may come more immediately from *caten*, the Anglo-Saxon offsping of *egio*. An observation of Mr. Tooke goes cer
tainly to prove the latter, if we can depend on its correctness. "In each language," says he, "where this impre
cative is used conjunctively, the conjunction varies just as the verb does. In Danish, the conjunction is *eg*, and the verb *ager*. In Swedish, the conjunction is *eb*, and the verb *eka*. In Dutch, the conjunction is *ek*, from the verb *ecken*. In German, the conjunction is *eb*, from the verb *ecken*. In Gothic, the conjunction is *ek*, and the verb is *akkan*." This example serves to shew how nearly allied these languages are one to another, and how a large portion of them is derived from the Greek and Latin.

*Lef* is affurled the Anglo-Saxon *get*, or *gu*, *olfs*, *stem*, though Mr. Tooke has referred it to the verb *to get*. This grammian seems not to have sufficiently studied those analogies by which the genius of a language is formed. The Anglo-Saxon, delighting in gutturals, forms many of its words by prefixing the particle *ge*, or the letter *g*. Thus, *getef*, *predeum*, is only the Greek *πηγε*, with *gie*; and *gen-

sage* is our among. This peculiarity gave birth to the German mode of prefixing *ge* to the perfect participle, and is the principle on which the Greek *αν*, in Anglo-Saxon is corrupted into *geta*, *get*, or *gut*. The Anglo-Saxon *fellen*, the German *fellen*, the Swedish *fella*, the Danish *felle*, originated in the Greek *φελλα*, which denoted first to lay down the fail of a ship. Hence in the above mentioned modern tongues, it came to signify, to place, *compens*, or *adjut*; but the general consequence of putting down the fail is to give *fillefs* or tranquility to the ship. Hence *ek* *ek* gave birth *alo* to the Anglo-Saxon *fellen*, and the English to *fell*, and to the conjunction *fells*. The Anglo-

Saxon and Gothic used it conjunctively in the forms of *fille* or *felle*, and its immediate parent undoubtedly is *fellen*, and not *fellen*, as Mr. Tooke would have us believe.

*Els*, with no lefs certainty, is the Anglo-Saxon *eles*, the Latin *alter*, and the Greek *αλλα*, and has nothing to do with *alfean*, to *difmiss*, and it means not *excepere* or *dismis*, but a change or difference in the consequence, or in the condition of what is expressed in the preceding clause. Thus, let the derivation be just, *else* it will not be received, *i.e.* otherwise it will not be received: let the derivation be just; if otherwise than just, it will not be received. On Mr.

Tooke’s principle the solution stands thus: let the derivation be just, *difmiss* it will not be received, an interpretation at once unnatural and unmeaning; and in order to give it the appearance of sense and coherence, he is forced to sup
po*se a clause understood*. Let the derivation be just, *difmiss* the derivation being just, or *difmiss* that circumstance, it will not be received: see his resolution of such examples in vol. i. p. 247. The conjunction *αλλα*, like *αλλω*, is a mo
dification of the pronoun *άλλος*, *another*; and may be re
solved in the same way as *else* in English.


GRAMMAR.

**On the conjunction although, or though,** we quote the following remark from the learned Dr. Jamieson, in his Etym. Dictionary. "Mr. Tooke derives though from the Anglo-Saxon *thuban,* or *thefgan,* to allow. But there is not the same evidence here, as with respect to other conjunctions illustrated by this acute and ingenious writer. It is not incredible to suppose that this word had some connection with the adjective *thuban,* which means *hardly,* and the verb *to allow,* or *to be allowed,* and the use of the word as an adverb, or conjunction, is but one of the possible modes of using this verb."

Mr. Tooke derives *but* from two different words, *butan,* to *but,* and *buten,* or *beten,* *bet,* or *bet,* and *to except,* and accordingly assigns the word two different senses, as it is taken from the one or the other. In opposition to this, we maintain that *but* is the Anglo-Saxon *buten,* or *butan,* and has the sense which it bears in that language of *except,* without, and no other but this, or one reducible into this. We further maintain, that the Anglo-Saxon *buten* is the Arabic and Hebrew הָלַע, *to cut,* which, as it exists in the former with the termination, is *butun,* and the principal idea implied in it is *separation,* with *but* has flowed from the same source; *bit,* a mark; *bit,* to separate with the teeth. Let us apply the word thus explained. I saw none but two plants—two plants being separated I saw none, or two plants being excepted or taken away, I saw none.

In such infinities as these, the negative is often omitted for the sake of brevity; but it must be supplied before the sentence can be explained. Again, "I have much to say on this subject, but I must proceed to another." Mr. Locke observed, that in such infinities, *but* intimates a stop of the mind, in the course it was going. But, says our grammarian, the truth is, *but* itself is the foot of any word in the language from intimating a stop. On the contrary, it intimates something more, something to follow. And, therefore, whenever any one in dicing finds in his words with *but,* the question always follows, but what? p. 205. Now, we hesitate not to say that Locke, though not right, is nearer the truth than Mr. H. Tooke. "I have much to say on this subject, let that however be separated, or that being separated or laid aside, I proceed to another." Here then *but* denotes the removal of the thing which already occupied the mind, and the succeeding word or words mark that which is introduced to fill its place. On such a removal the mind naturally looks forward to the introduction of something else; and its expectation in this respect forms no part of the meaning expressed by *but,* but is a habit formed by experience or affection. It might having remarked, that the Churches prayed, *conferred* places, and consulted the originals; Chillingworth replies, "you pray, but it is not that God would bring you to the true religion, but that he would confirm you in your own. You confer places, but it is that you may confirm or colour ever with plausible disguises your erroneous doctrines; not that you may judge of them and for sake them, if there be reason for it. You confit the originals, but you regard them not, when they make against your doctrine or translation." In all these places, *but* does not, as Mr. Tooke affirms, direct something to be *added* or *supplied,* but *denotes* a separation or removal of something that ought not to be separated or removed. You pray not that God would bring you to the true religion; you pray, motive being apart, that he should confirm you in your own. You confer places, the right object is separated, and you confer them that you may confirm, &c. You consult the originals, and regard them when they make for your doctrine; this regard is separated when they make against your doctrine or translation. Thus, whatever endings may be ascribed to *but,* they are all reducible into one original signification. Nor have we need with this celebrated grammarian to trace it into two distinct verbs, a thing in itself very improbable and contrary to all analogy, nor would he have adopted so unlikely an hypothesis, if it were not necessary for supporting his syllaon, in this passage, I came not to destroy, but to fulfill—I came not to destroy, another thing, (i.e. I came for another thing,) I came to fulfill.

Mr. Tooke derives *but* from two different words, *butan,* to *lot,* and *butan,* or *beten,* to *not,* or to *except,* and accordingly assigns the word two different senses, as it is taken from the one or the other. In opposition to this, we maintain that *but* is the Anglo-Saxon *buten,* or *butan,* and has the sense which it bears in that language of *except,* without, and no other but this, or one reducible into this. We further maintain, that the Anglo-Saxon *buten* is the Arabic and Hebrew הָלַע, *to cut,* which, as it exists in the former with the termination, is *butun,* and the principal idea implied in it is *separation,* with *but* has flowed from the same source; *bit,* a mark; *bit,* to separate with the teeth. Let us apply the word thus explained. I saw none but two plants—two plants being separated I saw none, or two plants being excepted or taken away, I saw none.

In such infinities as these, the negative is often omitted for the sake of brevity; but it must be supplied before the sentence can be explained. Again, "I have much to say on this subject, but I must proceed to another." Mr. Locke observed, that in such infinities, *but* intimates a stop of the mind, in the course it was going. But, says our grammarian, the truth is, *but* itself is the foot of any word in the language from intimating a stop. On the contrary, it intimates something more, something to follow. And, therefore, whenever any one in dicing finds in his words with *but,* the question always follows, but what? p. 205. Now, we hesitate not to say that Locke, though not right, is nearer the truth than Mr. H. Tooke. "I have much to say on this subject, let that however be separated, or that being separated or laid aside, I proceed to another." Here then *but* denotes the removal of the thing which already occupied the mind, and the succeeding word or words mark that which is introduced to fill its place. On such a removal the mind naturally looks forward to the introduction of something else; and its expectation in this respect forms no part of the meaning expressed by *but,* but is a habit formed by experience or affection. It might having remarked, that the Churches prayed, *conferred* places, and consulted the originals; Chillingworth replies, "you pray, but it is not that God would bring you to the true religion, but that he would confirm you in your own. You confer places, but it is that you may confirm or colour ever with plausible disguises your erroneous doctrines; not that you may judge of them and for sake them, if there be reason for it. You confit the originals, but you regard them not, when they make against your doctrine or translation." In all these places, *but* does not, as Mr. Tooke affirms, direct something to be *added* or *supplied,* but *denotes* a separation or removal of something that ought not to be separated or removed. You pray not that God would bring you to the true religion; you pray, motive being apart, that he should confirm you in your own. You confer places, the right object is separated, and you confer them that you may confirm, &c. You consult the originals, and regard them when they make for your doctrine; this regard is separated when they make against your doctrine or translation. Thus, whatever endings may be ascribed to *but,* they are all reducible into one original signification. Nor have we need with this celebrated grammarian to trace it into two distinct verbs, a thing in itself very improbable and contrary to all analogy, nor would he have adopted so unlikely an hypothesis, if it were not necessary for supporting his syllaon.
this union, or co-operation, is the copulative and; but when a
perion or thing opposes or counteracts another, or, in the
form of and, is combined with another word to express again or
in return; as and upon, a word in return for a word, i.e.
an answer; and against the sun, see Hicks's Anglo-Saxon
Grammar, p. 87. When objects act upon the organs of
sense, the mind is supposed in return to act upon the
impressions of those objects in order to perceive them, and
the perception so acquired is called in Greek ἀναπληραμα.
Hence, in Anglo-Saxon anaply, if we attend to the com-
position of the word, means that sense which the mind acts
or acquires by a reciprocal action on its own organs.

The conjunction, according to Mr. Harris and other
grammarians, connects not words but sentences, so as out of
two to make one sentence. Thus, you and I and Peter
rode to London, is one sentence made of three. But this
notion Mr. Tooke refutes by the following example; two
and two are four; A and B and C and D form a triangle.
John and Jane are a hand-ome pair. Does A B form a
triangle, B C form a triangle? Is John a couple? Is Jane
a couple? Are two four? p. 221. In truth, conjunctions
as well as prepositions affect words and not sentences,
and their office is to combine the words succeeding to the
words going before them, i.e. to combine a word coming
after with a preceding word; a noun coming after with a
preceding noun, an adjective coming after with a pre-
ceding adjective, &c.

Mr. Tooke has not given the etymology of than, though it
exists only in Anglo-Saxon under the form of thanne, and in
Gothic under that of thana. But in order to come at its
origin, we must attend to the effect which certain objects
produce on the organs of sense. When two qualities, un-
equal in degree, are compared, that which exceeds appears
to receive by means of the contral an immediate augmen-
tation; while on the other hand, the less seems to diminish.
This being the case, and human nature being the same in
all ages and countries, the same form of expressing the
degrees of comparison has obtained in all languages.
Thus in Hebrew tab min beryuth, good from gold, i.e. bet-
er than gold. The Arabs borrowed the Hebrew min to
express their comparative; and the Persians denote it by
az, a word of the same import. The Latin tongue in
this instance is founded on the same general principle —
Clarior folis, brighter from the sun. The French de and
the Italian di are derived from the Latin de; and as the use
of cafes in these languages has for the most part given way
to prepositions, they express their degrees of comparison
by these particles in the sense of from. In our own tongue
the mode of expressing the comparative seems alone un-
telligible. But by tracing than to its root the mystery
vanishes; and we recognize the same great principle of
nature. The imperative of the Hebrew גַּדִּל, גַּדִּל, which has given birth to corresponding verbs in all other
languages, is גַּדִּל than, which is precisely our English than,
retaining not only its original sound, but moreover its
original sense of give, put, place. Thus, his face was brighter
than the fun. Put the fun (namely by the side) his face
was brighter. Lighter than gold. Pat gold, it is lighter.
From the juxtaposition of gold it becomes lighter; or
as in other languages lighter from gold. I shall only add that
בָּשׁ, בָּשׁ, of the German, is a corruption of the He-
brew גַּדִּל, min or המ, b, v, being interchangeable
letters. Accordingly the Germans say in the superlative, der
belle von feinen brudern, the best from his brothers, the
bath of his brothers.

It still remains that we notice the adverbs and interjunc-
tions, but as we have already occupied too much of our readers at-
tention in discussing the other parts of speech, we shall dis-
patch these by one or two general remarks. Adverbs, or as
Mr. Harris designates them, attributes of a secondary kind,
are corruptions from nouns, adjectives, pronouns, and verbs.
The name of adverbs given to such corruptions is not, if it
should be observed, descriptive of their nature, as different
parts of speech, but of their use in modifying the verb or
adjective to which they are annexed. An adverb is often a
substitute for a whole clause, as here, for in this place; then,
for at that lime. In this view, adverbs are the only words
which properly come under the denomination of abbreviations,
a term of which Mr. Tooke is so fond, and to which he so
improperly refers several other parts of speech. As to in-
terjections, it may be questioned whether or not they can be
considered as articulate sounds, though they have been
usually honoured with a distinct department in language.
One consideration, however, is calculated to leave them in
polemic of their hitherto enjoyed honours. Interjections, it is true,
are not distinct names of our feelings and passion, and there-
fore they have no, like other words, derived articulation
from the association of sense with sound; notwithstanding
that certain expressions or cries, which in form of sound, in
nature, are as well calculated to recall to our minds ideas of
certain emotions, as if, like other words, they had been by
common consent made the signs of those emotions.

GRAMMAR is also used for a book concerning the rules
of grammar, which obtain in any language. See Lan-
Guage.

The ancient grammars are: for the Hebrew, that of rab-
bi Juda Ching, which is commonly held the first Hebrew
grammar that appeared; though it is certain, rabbi Saahas-
Haggam, who lived before rabbi Juda, composed two works
of the same kind: one expressly of grammar; and the other
of the elegancies of the Hebrew tongue.

For the Greek, the oldest grammar is that of Gaza: the
Latin ones are the works of Martianus Capella, Prifcin,
and Acofus Pedanius.

The modern grammars are: 1. For the Hebrew, that of
Pagninns, the edition of Hen. Stephens, or le Preux, at
Geneva, in 1592; that of Petrus Martinius at Rochel
1592; that of Buxtorf; that of Ludovicius Deus, in three
languages; that of Ssiximus Amoma, which is a collectio
from Martinius and Buxtorf; that of Bellarmin, with the
notes of Muis; the of F. Sgianther, of W. Schickard,
and of Vict. Bytlimer, to the latter of which is annexed a
brief account of the Chaldee, are useful for beginners; and
those of Gronovius, Schultens, Schroader, Bayly, Bennet,
Robertson, &c.; and for the Hebrew, without the Mafforetic
points, the excellent grammar of Mafiel, to the second edi-
tion of which, published at Paris in 1745, are annexed Chal-
dee, Syriac, and Samaritan grammars; those of Sharp,
Wilson, Bates, Parkhurt, &c. 2. For the Chaldean, the
belt are those of Martimiis, Buxtorf, and Lud. Deus, in three
languages. 3. For the Syriac, those of Amd, Myricans,
Water, and Beveridge; with the Chaldee and Syriac ones
of Buxtorf, of Lud. Deus in three languages, and that of
Lanc-
den. 4. For the Coptic, the Prodomon Coptas, and Lingua
Egypitaca Refituta of Kircher. 5. For the Arabic, that of
Erpenius, and that of Golus, which is only Erpanius’s a little
augmented. 6. For the Ethiopic, that of J. Ludolphus.
7. For the Persian, that of Lud. Deus, and that of Sir
William Jones. 8. For the Sancrit, that of Wlkins and
Carey. 9. For the Armenian, that of Schroder and
Galanus. 10. For the Greek, that of Mart.
Rahandis Syiburgius, F Moquet, Volnus, Gaza, Her-
man, Bahly, Port Royal, Manutius, Bell, Milner, Moore,
Parkhurt, Valpy, Jones, &c. 11. For the Latin, those of
Diogenes, Defianter, the Minerva of Santtius, those of
Volnus, Ward, Clark, and Sprat; that of Port Royal, which

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is only a collection from the rest; those of Lowe, of Etow, of Jones, &c. 12. For the Italian, those of Berger, Lanfre-
dini, Port Royal, and Veneroni, Baretti, &c. 13. For the Span-
ish, those of Salazar, Port Royal, the abbot de Vairac, &c. 14. For the Portu-
guese, that of Pereira. 15. For the French, those of the abbe Regnier, and F. Baffier, &c. 16. For the High Dutch, those of Claius, Hertzbergus-
en, Schetkelius, Boedichier, and Steinbach. 17. For the Ger-
mans, that of Wendeoro, &c. 18. For the English, those of
Wallis, Brightland, Greenwood, Lovth, Priestley, Mur-
ray, Cromeby, &c.

Grammar is also used in the same sense with elements;
as geographical grammar.

Grammar, Philosophical, is that which, without regard-
ing the several idioms of particular languages, only reflects
those principles that are essential to them all. One of this
kind was proposed by lord Bacon; not upon the analogy of
words, but such as should diligently examine the analogy or
relation between words and things. He disapproves too cu-
rious an inquiry about the original imposition and etymolo-
gy of names. This he thinks an elegant, and, as it were, a
waxed subject, that may be handomely wrought and twisted,
but is attended with little truth and advantage. But, says
he, it would be a noble kind of grammar, if any one well
versed in languages, both the learned and the vulgar, should
think of their various properties, shewing wherein each of
them excel and fall short; for thus languages might be en-
riched by mutual commerce, and one beautiful image of
speech, or one grand model of language, for justly express-
ing the sense of mankind, he formed like the Venus of
Apelles, from the excellencies of several. And thus, at the
same time, we should have some considerable marks of the
genius and manners of people and nations, from their respec-
tive languages. See Bacon's Doctrine of Delivery, § 7;
and De Augm. Scient. vi. 1.

The object of philosophical or universal grammar is speech
or language, as divided into its constituent parts, as a statute
may be divided into its several limbs; or elicit, as resolved
into its matter and form, as the same statute may be resolved
into its marble and figure; and thus it is distinguished from
the art of logic, which considers speech as combined or com-
posed, so that by this synthetic, simple terms are com-
bined to produce a truth, and two truths are com-
bined to produce a third, &c. In this kind of grammar,
the design is to point out the several powers and modes of
expression which sounds are capable of, to trace their
connections with, or relation to the ideas they represent;
and to show the actual variety of the external expressions
of the same mental conceptions which different languages
exhibit. By this comparison we shall be enabled to judge
which is the most adequate and convenient method of ex-
pression, what is defective and what is redundant in the
structure of any particular language, and direct to the most
proper method of supplying the defect, or effacing the in-
conveniences arising from the superfluity. (See Lan-
guage.) See an excellent and well-known work of this
kind, by the ingenious and learned Mr. Harris, called the
Hermes, or a Philosophical Enquiry concerning Universal
Grammar, 2d ed. 1765. See also Troke's Diversions of
Purley, and the preceding article Grammar.

GRAMMAR, Character in. See Character.

GRAMMARIAN, Grammaticus, a person well versed
in grammar; or who teaches grammar.

The denomination grammarian is, like that of critic, fre-
quently, though unjustly, used as a term of reproach; a mere
grammarian; a dry, plodding grammarian, &c. The gram-
marian is conceived as a person wholly attentive to the minute
of language; industriously employed about words and phrases;
and incapable of perceiving the beauties, the delicacy, finenesse,
extent, &c. of a sentiment.

Scaliger, however, considered grammarians in another light.
"Utinam elixam," says he, "bonum grammaticus? fulleit
enigmaticum, qui noites anchores probe vult intelligentia, effic
grammaticum.

The title grammarian, it is certain, was anciently a title of
honor; being given not only to such as applied themselves
to grammar, or excelled in philology; but to all who were
reputed learned in any art or faculty whatever, as is shown

The word was properly a title of literature and erudition,
and was frequently given to persons who excelled in all, or
many arts, called into polyhistori.

Thus, Philoponus, a famous philosopher in Justinian's
time, remarkable for the extent and variety of his know-
ledge, was furnamed Grammaticus, as appears from Photius's
Bibliotheca.

So Saxo, the Danish historian, in the 13th century, got
the appellation grammaticus; and as late as the year 1580,
Thomas D'Avisa, a celebrated Neapolitan lawyer, was fur-
mained the Grammarian.

The title grammarian was anciently bestowed on those
now called critics, men of learning, erudition, letters, &c.
and particularly such as wrote well, and politely, in every
kind.

It is in this sense that Suetonius intitiles his book which
he wrote on the first Latin authors, "Of the celebrated
Grammarians: ; and that Cornelius Nepos calls the com-
mentators on the orators and poets, grammarians; and
lately, it is in this sense the appellation is attributed by the
ancients to Apion, Philoponus, and Solinus.

The most celebrated grammarians of the second century
were Aper, Pollio, Eutychius, Proculus, Athenæus,
Julius Pollux, Macrobius, and Aulus Gellius: the works
of these last authors are an assemblage of abundance of
very different things, and subjects relating to the criticism
of the ancient writers, and the polite literature.

If the name have lost its ancient honor', it is through the
fault of those who have abused it; by their treating of
grammar in a low, pedantic, dogmatic manner; reducing it
to words and syllables; and dwelling altogether on tritris
puerile remarks and confusions: whereas its ancien office was
to make an accurate and thoroughexamun of an author;
to enter into all his views; to point out the beauties, and
the defects thereof; to dilate upon the true beauties from
the false; and the genuine productions of an author, from
the figments; that is, a grammarian was then, what we
call a critic now.

Those who only taught to read, understand, and explain
authors, were called grammatici, grammaticæ; in contra-
distinction from grammatici; though, in course of time, the
grammatici have risen in the place of grammatici, who are
now preferred to that of critics.

GRAMMATICAL, something relating to gram-
mar.

We say, grammatical construction; grammatical signifi-
cation, &c. Idioms, as Angulifins, Latinifins, Grecifins,
Gallicifins, &c. deviate from grammatical strictures. Such
a phrase is not grammatically just; it is an idiom.

GRAMMATICAL Criticism. See Criticism.

GRAMME, in the new weights of France, is the weight
of a centimetre of distilled water at its maximum of density,
= 18.8247 French grams = 15.444 English grams =
.022045 English avoirdupois pounds.

This weight is the standard, or unit, of the new systerm
of weights; 100, 1000, and 10,000 times its weight,
beeing expressed by the prefixes, den, kilo, mile, and myria,
respectively.
respectively; and γ, 6th, η, 7th, and ω, 8th, by the prefixes dein, centi, and mill. Thus, hectogramme signifies 100 grammes, and centigramme signifies the 100th part of a gramme.

GRAMMELOUCh, in Natural History, the name of an East Indian shrub, very common in the woods and forests. It grows to five or six feet high; its leaves are very long and narrow, and terminate in a point; they are of a lively green; the fruit is carried in a bag of a triangular shape, of the size of a hazel-nut, but something longer; on opening this there appear three cells, in each of which is contained one fruit, resembling the seed of the palma Chirili, but covered with a transparent pellicle, and a black one under that; the inside of the fruit is white, and is of a sharp and pungent taste. It is a very violent medicine, operating both by food and vomit, and that often, so as to endanger the life of the person who has taken it. They alay its operation by eating betel. Mem. Acad. Par. 1629.

GRAMMICA, in Botany, from γραμμα, a line, aligning to its slender thread-like form. Locurie. Cuchinie. 1769, appears evidently by his description to be a species of Cufetia, or Dodder. See CUSCUTA CHINEA, n. 6, which is probably the very plant.


Esch. Ch. Cotyleds in straight feattred lines. Cover none.

This genus differs from Polypodium, in having its capilile disposed in straight continued lines, instead of round dots. The involucrum is wanting in both. Dr. Swartz defines twelve certain species. Of these such as have a simple undivided frond, like G. lanceolata, Swartz. t. 1. f. 5, form the most natural affemblage. The genus has, however, the advantage of admitting some forms, which preceding writers did not well know how to dispose of, as G. Ceterach, (Afpplenium Ceterach; Linn. Sp. Pl. 1538. Scolopendrium Ceterach; Sm. Pl. Brit. 1171. Eng. Bot. t. 1244) and G. laeppophyllum, Swartz. t. 1. f. 6, which Linnæus and other botanists had hesitated whether to reckon a Polypodium or an Afpplenium.

Dr. Swartz mentions two doubtful species; the Polypodium graminum of Linnæus, perhaps his own Grammitis linearis; and the Afpplenium subfine, of Cavanilles lectures, n. 627, a native of the Philippine islands.

GRAMMONT, in Geography, a town of France, in the department of the Scheld; and chief place of a canton, in the district of Audenarde, built at the foot of a mountain by the Goth, and thence called "Gotteghem." When Baldwin de Mons, count of Flanders and Hainaut, purchased the lordship of one Gerard, in 1068, he built a town, calling it after the name of the former lord, Gerardmont; and hence, by corruption, Grammont. It is partly situated on a hill; and the river Dender, which runs through it, divides it into the Higher and Lower Town; 20 miles W. of Brussels. The place contains 50,080, and the canton 16,000 inhabitants, on a territory of 92,4 kilometres, in 17 communes.

GRAMMUM, a town of Hindooslan, in Myfory; 44 miles N. of Serinapatam.

GRAMPINE HILLS, a range of mountains, extending from E. to W. through almost the whole breadth of the kingdom, from Loch Lomond to Stonehaven, and deriving their name from one of them, the "Mons Grampis" of Tacitus, where Galgæus waited the approach of Agricola, and where was fought the battle so fatal to the brave Caledonians. This chain of hills forms the southern boundary of the Highlands; though four or five counties on the N.E. of that chain have, in their eastern and northern parts, the name of Lowlands. The transition to the Grampians is gradual; the first chain, according to general Roy, consisting of the Sadley-hills on the E., the Ochils in the middle, and Campy-hills on the W. To the Grampian chain belong Ben Lomond, 3262 feet high; Ben Ledy, 3009; Ben More, 3503; Ben Lawers, the chief summit, 4015; Scheallien, 3564; Ben Verlich, 3300; and other less considerable elevations on the cafl.

GRAMPONK, a small borough and market town, in the hundred of Powder, and county of Cornwall, East England, is situated on the banks of the river Fal or Fale, in the parishes of Creed and St. Probus, the eastern part of the borough being in the former parish, and the wester in the latter. Grampound is fuppoted, by Bolkafe, to fand on the feite of the Volba of Piolemy. Extensive privileges were conferred on this town by king Edward I., particularly a freedom from toll throughout Cornwall; and the remains of a Caedufa, or Pion, granted with all the lands in it by this monarch, are still extant. The right of holding a market was a grant from John of Elizaun, earl of Cornwall, and brother to Edward III., who, after the death of earl John, confirmed the first charter, and made the town a borough; but no representatives were returned to parliament till the reign of Edward VI. Two members are now elected by the magistrates and inhabitants paying foot and lot; but the whole number of voters is only 25. The corporation consists of a mayor, eight magistrates, a recorder, and a town-clerk. The church is about half a mile from the town, in the parish of Creed; but a small chapel of ease stands near the centre of the borough. Grampound is 263 miles S.W. from London; has three annual fairs, and a weekly market on Saturdays. In the return under the late act, the inhabitants amounted to 5355; the houses to 864; Polwehle's History, &c. of Cornwall.


GRAMPUS, in Lichnology, the Delphin us erra of Linneus; which see.

GRAMZOW, in Geography, a town of Brandenburg, in the Ucker Mark; 8 miles S.E. of Preilow.

GRAN, or Esztergorn, or Strigæun, a town of Hungary, situated near the conflus of the rivers Gran and Danube; the fee of an archbishop; 55 miles S.E. of Preilow. N. lat. 47 44'. E. long. 18'.

GRAN, a small island on the W. side of the gulf of Botnium. N. lat. 62 1'. E. long. 17 22'.

GRANA, a sea-port of Spain, in Galicia; 2 miles W. of Ferrol. N. lat. 43 20'. W. long. 8 15'.

GRANA Figlia, in the Materia Medica, the fruit of a species of richius.

GRANA Paradisi, or Greater Cardamons, are the seeds of the amomum of Linneus.

GRANA Regia, the seeds of the common richius, called by some palma Chrilli.

GRANADA, or GRANADA, sometimes called Upper Andalusia, in Geography, a kingdom or province of Spain, occupying half of the eastern extremity; and all the southern part of Andalusia as far as the straits of Gibralter, has the form of a pyramid with its base to the east, on the kingdom of Murcia, and its apex to the south-west towards the Straits. Its length is 38 leagues from the E. to the S. E.; the breadth at its apex seven from the S.W. to the N.E., and at its base 28 from S. to N. To the E. and N.E., it is bounded by the kingdom of Murcia; to the S. and S.E. by the Mediterranean; to the W., by the kingdom of Seville; to the W. and N.W. by that of Cordova; and
GRANADA.

and to the N.W. and N., by that of Jaen. It lies between 36° 20' and 38° N. lat. and between 5° 4' and 1° 30' W. long.; and contains about 650,000 inhabitants. This province has three fronts on the Mediterranean, viz. that of Amunecar, defended by three forts of little importance; that of Almeria, which was celebrated under the Arabs; and that of Malaga, the most flourishing and most frequented. Its principal towns are Granada, the capital, Malaga, Almeria, Guadix, Motril, Marbella, Velez-Malaga, Baza, Vera, Ronda, Loja, Santa Fé, Huefca, Antequera, and Alhama. Its rivers are the Verde, Xeril, Las Feguas, Guadalemén, Guadavil, Guadameche, Rio de Almeria, Rio Frío, Guadixmerina, Darro, Andaray, Guadix, Bravata, Marhán, Almancora, Aguas, Culebras, and Guadalete. This province is very mountainous; its chief mountains being the following, viz. the Sierra Verdet, or Vernejal, i.e. red mountain, so called from the colour of the soil, the Sierra de Blanquilla, the Sierra de Bajo, the Sierra Blancaquilla, or white mountain, denominated from its appearance at a distance, and the Sierra de Javal-Cohol. The Sierra Nevada is a grand and beautiful mountain situated nearly in the centre of the province; it takes its name from the snow that remains on it through the year. It is very lofty, can be seen at a very great distance, and is well known to mariners, who discover it far out at sea. The Sierra Alpujara, likewise in this province, is formed by the contiguity of several lofty mountains, and generally called the Alpuxarés. These afforded a retreat to a considerable number of Moors driven from Granada, who remained there 120 years, till their total expulsion from Spain. The Sierra de Ronda lies on the southern and eastern part of the province of Granada; stretching N. and E. in that of Seville, and running S. towards the straits of Gibraltar. Granada, although mountainous, contains plains of considerable extent, and pleasant valleys abounding in springs.

Granada, as a part of Andalusia, was first known to the Physicians and then to the Carthaginians, who were expelled by the Romans; and they also were expelled, in the fifth century of the Christian era, by the Vandals; and the Goths, led by Euric, afterwards took possession of the country. The Arabs entered Spain by Andalucia in the year 711; and after the battle of Xeres, which decided its fate, as well as that of Spain, it belonged to the caliphs of Damascus, and then to those of Bagdad; till at length Abdalrahman, or Abderrame, a prince of the blood-royal of the Ommites or Almohades, feized on the throne of Spain in 755. In the year 1027 the empire of the Moors in Spain was dismembered; and in 1221 the kingdom of Granada was dissolved. Soon after this period, viz. in 1236, Mahommed Alamir, or Alhamar, founder anew the kingdom of Granada; and his descendants preferred for about 2½ centuries the throne, which he transmitted to them. It was reserved for Ferdinand V. and Isabella his queen, to give the last blow to the power of the Moors, by depriving them of the kingdom of Granada at the end of the 13th century. The capture of Malaga, Aug. 18th 1487, facilitated the siege of Granada, the capital of the province, into which the Moors had collected their whole force. They were attacked in 1491, and after a siege of upwards of a year, the town was obliged to surrender to the Catholic armies; and thus in 1492 the Moorish empire in Spain terminated. The extent of Granada at this time was 70 leagues long and 30 broad; it contained, as is said, 32 great towns, 97 smaller ones, upwards of 3000 boroughs and villages, and 5,000,000 of inhabitants. The revenue derived from it amounted annually to 700,000 ducats; and gold and silver abound more in this kingdom than in any other country of Europe. But the astonishing fertility and wealth of this country passed away with its old inhabitants, and were succeeded by a deplorable degree of indolence, poverty, and misery.

GRANADA, or Granada, the capital of the province above described, and an archbishop's see, is a large city, which was entirely built by the Moors in the tenth century; and in 1235, after having previously belonged to the dominions of the kings of Cordova, it became the capital of a new empire, and soon acquired great celebrity in the Moorish annals. This town, which in a short time became important for its extent, population, wealth, and power, and the magnificence of its buildings, became, in process of time, the ultimate refuge and last bulwark of the authority of the Moors in Spain. We have already given an account of its surrender to the Catholic kings. At that period it was three leagues in circumference; its ramparts were defended by 1030 towers; its walls included 70,000 houses, and a population of 400,000 inhabitants. It had an army of 60,000 men; and the number that defended its ramparts in 1491 and 1492 amounted to 100,000. It was protected by two fortresses, each of which was large enough to contain 40,000 men.

This town stands on two hills, at the end of the plain called Vega de Granada, near the Sierra Nevada, on the banks of the Darro which runs through it, and of the Xeril which bathes its walls. The two fortresses just mentioned are on the summits of the hills on either side, thus commanding the town, which itself commands the beautiful adjacent country ten leagues round; and its situation is delightful. The plain, at the extremity of which it stands, is somewhat sloping; its diameter is from nine to ten leagues, and its circumference 30; on the N. it is bounded by the Sierra Nevada and the mountains of Elvira, and on the other sides by succeffive and varied amphitheatres of hills agreeably planted with vines, olives, mulberry, lemon, and orange trees, &c.; it is watered by five rivers, intersected by various canals, supplied from limpid rivulets with a number of springs; and it is covered with meadows, forests of oak, woods of orange-trees, orchards, sugar-canes, corn, flax, and in short all kinds of fruits and vegetables.

Granada was formerly divided into four quarters, viz. Granada, Albambra, Albayzin, and Antiquera. Of these, the first, or Granada, is the handomest, most important, most agreeable, best built, and best inhabited part of the town. It occupies the commencement of the plain, and a part of the valley between the two mountains; it is embellished with a number of fountains, large gardens, handomé squares, and fine buildings; it is inhabited by the nobility, clergy, magistracy, and the richest of the citizens; and the principal markets are situated in it. The quarter of Albambra, properly speaking, is only a great fortess, situated on a mountain, called Sierra del Sol, or mountain of the sun; it was the residence of the kings, whose palace still preserves great beauties. (See the description of it under ALHAMBRA.) The quarter of Albayzin resembles a faubourg raised on a hill, where was formerly a fort, which commanded and protected the town, from which it is separated by a rampart. It contains about 400 houses. Antiquera has the appearance of another faubourg built upon the plain; it was peopled by settlers from Antequera, and is at presente chiefly inhabited by dyers and silk weavers. Among the numerous squares of Granada we may specify as the handomest, El Campo, in which is a hospital; the Plaza Mayor, which is spacious, and used for public shows, particularly the bull-fights; and the Divarat-mia, embellished by a beautiful Jasper fountain, and by the two fine edifices of the Alhambra, which was used by the Moors.
Moors as a bazaar, and still appropriated to the purpose of a market-place, and containing about 200 shops; and the palace of the chancery. To these two buildings we may add an ancient mosque, now a parish-church, the cathedral, two hospitals, and the two palaces of the Alhambra. The cathedral is not large, but has a handsomely done, reeling on twelve arches, supported by many large pilasters; the vault is full of paintings and richly gilt, and two rows of gilded balconies run round it over the arcades. Statues of the twelve apostles in bronze, gilt, and as large as life, are placed against the twelve columns. The vault of the church of the Charterux is covered with fine paintings in fresco, by Antonio Palamino. In many of the houses are found remains of baths, constructed by the Moors; and most of the houses are embellished with fountains, which supply water not only for domestic purposes, but for moderating by its coolness the heat of a climate extremely warm in summer.

Granada is an archbishopric, worth 25,000 l. a year, containing a cathedral chapter, six collegiate chapters, and 194 parish churches. This city is the seat of a royal chancery, divided into six chambers, and composed of a president, twenty-five counsellors, two solicitors, and one alguazil mayor. The intendent of the province resides here; and the town has a criminal judge, two alcaldes mayors for the administration of justice, a municipality composed of a certain number of regidores, a war auditor, and a tribunal of the inquisition. The Alhambra has a jurisdiction peculiar to itself. The city is divided into twenty-three parishes, with forty convents, three beatarias, seventeen hermitas or chapels, nine hospitals, and eight colleges. Granada has an university, founded A. D. 1531; and an academy for painting, sculpture, and architecture, conducted at the king's expense, and free for all. The extent of Granada is nearly the same as it was under the Moors; but its population is very much diminished. In 1614, at the period of the total expulsion of the Moors from Spain, a very considerable number of the families of that people left it. The town, which had counted 400,000 individuals within its walls, and which had armed 100,000 warriors in its defence, is now reduced, according to the government returns dated by Mr. Townend, (Travels in Spain, vol. iii.) to 52,352 souls; although, upon good authority, he says, they may be reckoned 80,000. Under the Moors, Granada carried on a great trade, and was famous for its own productions; it manufactured cloths, various kinds of wooden utensils, and a great quantity of silk. Indeed, it is not possible to think of manufactures in Granada, without calling to mind the expulsion of the Moors, and pausing to examine the policy of that strong measure. They were numerous, and, in consequence of their industry, accompanied with frugality, they had acquired opulence and power. It is said, (see Townend, ubi supra,) that of 100,000, condemned by the inquisition for apostatizing from the Christian faith, 4000 had been burnt without any good effect. Philip III., in the year 1569, banished to Africa 140,000 out of the kingdom of Valencia; and in the three years following, 620,000 from Seville, Murcia, and Granada. If to these we add the multitudes that perished by famine, and by the sword, we shall be inclined to rate the loss to Spain at one million of its most active subjects. This loss, added to what the country had sustained by the previous expulsion of 800,000 Jews, with all their wealth, in the reign of Ferdinand and Isabella, was, under such a government as that of Spain, irreparable. The Moors are acknowledged by the skilled Spanish writers to have excelled in agriculture, particularly in watering their lands, in the cultivation of mulberry trees, the sugar-cane, rice and cotton, all introduced by them; in their peculiar breed of horses; and in the manufactures of silk, of paper, and of gunpowder, first brought into Europe by them. The manufactures of Granada, however, continued to be somewhat flourishing about the middle of the sixteenth century. Some regulations, favourable to them, were adopted and established in 1552. At that time great attention was paid to the production of silk in Andalucia, and the trade in it was prosperous. But, in process of time, as the consequence of the expulsion of the Moors, the privileges and immunities granted to the hidalgos or knights, bearing in the kingdom of Granada the proportion of 1797 to 63,490, the whole number of inhabitants, and various oppressive restrictions and burthens, agriculture languished, silk was neglected, the manufactures decayed, and in the seventeenth century few or none remained. Some attempts have been lately made to revive them; some new ones have been established, in which ribbons and silk fans are made; but they have not been very prosperous. Here is a manufacture of gunpowder on the king's account. In the production of nitre, at the salt-works near this town, about 100 men are employed in summer, and 26 in winter; and from these government obtains 30,000 quintals annually. In the vicinity of Granada are some considerable plantations of the sugarcane.

The environs of Granada are delightful; the public walks, of which the most frequent are those on the banks of the Xenil with cooling shade and refreshing fountains, and another, more wild and romantic, by the side of the Darro, are pleasant; and the country all round the city appears to be well cultivated. The market gardens appear like a wilderness of fruit trees, and yet are covered with the most luxuriant crops of all kinds of vegetables. Every cottage has a little court, or bower, formed by a lattice frame, and wholly shaded by the vine; under which, in the evening, the peasant assembles his family to take refreshment; whilst the nightingale from every tree is uttering his plaintive note. These gardens are all plentifully watered. Granada abounds in marbles, remarkable for their variety, and fountains of grain, beauty; and it has also a variety of alhambas, papayers, and other precious stones. Its mineral waters are also various and abundant.

Granada, a small town in the province of Nicaragua, seated at the S.E. extremity of the lake of Nicaragua, has considerable commerce in indigo, cochineal, hides, and sugar. In the year 1683, this town, and also Leon, the capital of the province, were pillaged by the buccaneers of America. N. lat. 11° 15', W. long. 86° 15'.

Granada, New, a viceroyalty of the dominions of Spain, in South America, extending from the river Tumbez to the Caribbean sea; that is, from S. lat. 3° 30', to N. lat. 12°, or about 930 geographical miles; its medial breadth may be rated at 4° or 240 geographical miles. This grand and opulent viceroyalty, though it dates its origin from the year 1718, was, after a long supplication, only established finally in 1742. It is sometimes called from its capital Santa Fé, and comprises the following provinces: viz. Juan de Braconnoros, Loja, Cuenca, Macas, Riobamba, Gayaquil,quito, Tacames, Paños, Barbacoas, Papayan, Rapuño, Novita, Antioquia, Santa Fé, San Juan de las Llanos, Merida, Santa Marta, Cattagena, Zinn, Choco, and the Tierra Firme, including the three districts of Darien, Panama or Tierra Firme proper, and Veragua. The ample provinces which form this viceroyalty were mostly discovered and annexed to the dominions of Spain about the year 1536, by Sebastian de Benalcazar, and Gonzalo Ximenes de Quevedo, two of the bravest officers employed
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in the conquest of America. The former, who commanded at Quito, made an attack from the south, and the latter from Santa Marta on the north. As the original inhabitants of this region were farther advanced in improvement than any people of America, but the Mexicans and Peruvians, they defended themselves with great resolution and good conduct. The abilities and perseverance of these two officers ultimately prevailed, after encountering many dangers, and reduced the country into the form of a Spanish province. The kingdom of New Granada was at first governed by the royal audience founded in 1547, and by its president the captain-general. In 1728 this arrangement was changed, and the viceroyalty was established; but it was suppressed in 1744, and finally established in 1750. When the conquerors first took possession of this country, it was more populous than the generality of the other states; and its want of population at this time prevents its being rendered one of the richest in America. The government refashions that of the other vicerealties; with a royal audience at Santa Fé, the capital, a tribunal of accounts, a treasury, and a royal mint. The royal audience sits in the same hall for civil and criminal causes; there being five judges, a fiscal, a protector of the Indians, and other officers. The governments, comprehend in the royal audience, are Cartagena, Popayan, Santa Marta, Maracaibo, and Portobelo, with the district of the river Hacha; in the interior are Antioquia, Choco, Veraguas, Nueva Granada, Giron, Neiva, and the Llanos. There is also a royal audience at Quito, and a governor and president, who rules the southern provinces in subordination to the viceroy of New Granada. But Quito remains a bisho]pople while Santa Fé is an archiepiscopal, founded in 1562, with Popayan and Cartagena as suffragans. In 1783 the archbishop was named viceroy. There are also several millions in the country called Los Llanos, and on the Apari, Meta, and Cauca, with some little villages or flatlands. These on the Upper and Lower Orinoco, and river Negro, affixed to the Capuchins in 1769, belong to the government of Caraccas.

The population of this viceroyalty has not been accurately ascertained; but if the general population of Caraccas amounts to 728,000, it is probable, says Mr. Pinkerton, that rather more than one million may be allowed for that of Granada. Of the amount of its revenues we have no certain documents; but from the amount of the annual coinage at Santa Fé and Popayan, and allowing a tenth to the king for the expenses of government, they cannot be less than 220,000 pounds. The state of the military force is inconsiderable; nor would it be easy in these difficult provinces to collect an effective force of five or six thousand men. The capital of this viceroyalty is Bogota, or Santa Fé de Bogota, for an account of which see those articles. Of the other principal cities and towns notice is taken in the progress of this work. The commerce of this viceroyalty has very much suffered from the supression of the galleons; and though it has been encouraged by the freedom granted in 1775, it is not yet recovered. The contraband trade, carried on by the English on the Mufquito shore, and from the Portuguese settlements in Brazil, and the Caribbean sea, has impeded the exertions of the Spanish colonies. Its commerce is allowed to be very disproportioned to the distinguishing advantages of this territory. Its existence almost depends on the gold from the mines, a few manufactures, and some native products. The manufactures are carried on chiefly at Tunja, Socorro, Villa Rica, and other towns and villages towards the plains; and they consist of cotton cloths, carpets, counterpanes, and vessels of various descriptions, that support internal trade. The northern provinces produce excellent wood for the construction of ships; and the dyeing woods are superior to those of Campbeley. The frequency of Panama is exquisitely beautiful, and superior to all others. The chocolate from the banks of the Magdalena is esteemed equal to that of Caraccas; and vast harvests of cotton and tobacco might be gathered, while the navigable rivers Magdalena and Atrato, and the ports of Caraccas and Santa Marta, offer easy and commodious outlets to the European markets. Its intermediate part of Havanais presents another convenience to the traffic of this viceroyalty. The culture of coffee and chocolate is in a prosperous state in the province of Guayaquil. The salutary and useful vegetable productions of these extensive provinces are so numerous and diversified, that industry alone is wanting to open all the sources of commerce.

The climate of this extensive viceroyalty presents great variety; for though it lies under the equator, and in its vicinity, the enormous and sublime chain of the Andes, running N. and S. from the Table land of Quito and Cuenca to the Caribbean sea, and environs of Santa Marta, occasion every diversity from the snow and ice of the poles to the rain and heat of the tropics. The great rivers Magdalena and Atrato, and the lakes and terrains in this province. The animals are in general such as are common to the whole continent of S. America; and the inhabitants breed a number of horses and mules which they send to Peru. The mineralogy of New Granada cannot be reckoned unimportant; Alcudia, called by Pinkerton, obseiues, that gold is here more abundant than in any other part of America. The richest provinces in this respect are those of Choco and Antioquia; and they are easily accessible by the rivers Atrato and Guacarca, which enter the gulf of Darien, and are navigable for a considerable extent. Silver is also remarkably pure; and the mines of Marquetones, in the district of Pamplona are fo rich, that if they had a sufficient number of labourers, they might rival those of Potosi, as they sometimes yield eight marks of silver in the hundred weight. Copper and lead also abound, but they are not much valued; and the various kinds of precious stones are plentiful. Platina has been thought to be the peculiar product of Choco. Salt is obtained in great abundance. The natives use maize, or the Cassava root, instead of bread. Game is abundant; and the rivers and lakes furnish an ample supply of fish. The natives are tall, and wear thick, white, or variegated cloaks, which they tie round the waist with a thaf. They adorn their heads with filings of painted flowers very ingeniously made of cotton. Robertson's America, vol. iii. Pinkerton's Geog. vol iii.

GRANADIER, Grenadier, or Granadero, a foot-solder, who is armed with a firelock, bayonet, and in former services a flanger, and a cartridge-box that will hold 36 rounds. They wear a high cap, fronted with a piece of braos, on which the king's arms is generally represented, &c. and a piece of cloth upon their shoulders, called a wing. In former armies they have better pay than a common soldier. They were first established in France in 1647, and soon after formed into companies: they were first known in England in 1687.

Granadiers, or Grenadiers, Horde, called by the French grenadiers velins, or flying granadiers, are such as are mounted on horseback, but light on foot and on horsecap. They were first established in France by Lewis XIV, in 1676, and formed into squadrons.

Every battalion of foot has generally a company of granadiers belonging to it; which generally take the right of the battalion; and, being the tallest and stoutest men, frequently are the first in attacks.
We have had in England two troops of horse grenadier guards; the first raised in the year 1693, and the second in 1701.

GRANADILLA, in Botany, the diminutive of the Spanish name of the Pomegranate, Granado, used in the West Indies, and retained by Tournefort and Adanson, for the *Pajifera of Linneaus*. This appellation is particularly applied to the fruit of *Pajifera quadrangulifera*, much esteemed by West Indians, and sometimes ripened in England.

GRANADO, Granada, or Grenade, in the Military Art, a hollow ball or shell, of iron, brass, or even glabs, or potter's earth, filled with gun-powder, and fitted with a fuse to give it fire.

The name granado takes its rise hence, that it is filled with grains of powder, as a pomegranate is with kernels. Of these there are two kinds; the one large, the other small; the first are to be thrown at the enemy by a mortar, properly called bombs, or field. The latter to be cast with the hand, and thence denominated hand-granados.

The best way, Cafmir obsevers, to secure a man's fell from the effect of a granado, is, to lie flat down on the ground, before it burst.

The common, or hand granado, is a little, hollow ball of iron, tin, wood, pasteboard, or other matter, filled with strong powder, lighted with a fusee, and thus thrown by hand into places where men flaid thick; and particularly into trenches and lodgments. These are now firk into diff'e.

Their composition is the same with that of bombs; which bee. For fire, they are usually between two and three inches in diameter, about the bignets of a common iron bullet, and weigh about three pounds; as to dimensions, they are commonly in thickness one-eighth, one-ninth, or one-twelfth of their diameter; their aperture, or orifice, about onehalf, as prescribed by Cafmir, Thuanus obseruer, that the first time granados were used, was at the siege of Wachtendouch, a town near Gheldres; and that the inventor was an inhabitant of Veulo; who, in making an experiment of the effect thereof, occasioned two-thirds of that city to be burnt; the fire being kindled by the fall of a granado.

Bombs were known long before the invention of granados. The ancients had a fort of ollas, or fire-pots, somewhat of the fame nature with our granados, but they were much less perfect.

Cafmir mentions a fort of blind granados, without any aperture, or fusee, as not needing to be lighted; but being thrown with a mortar, they take fire of themselves whenever they fall on any hard solid object.

GRANARD, in Geography, a neat, new built market and poll town of Ireland, in the county of Longford. Adjoining is a remarkable hill or mount called the Ablad of Granard, thought to be artificial, and the site of a Druidil fort, which commands from its summit a most extensive prospect into fix or seven adjoining counties. It is 52 miles from Dublin, and 12 from Longford.

GRANARY, in Agriculture, a building contrived for laying up and storing corn, in order to preserve it for a length of time. They have, near Grand Cairo; magazines or granaries, called "Joseph's granaries," defended with wooden walls, in which vast quantities of grain are annually preserved; and many parts of Africa abound with granaries of this kind. They are frequently deep pits made in the solid rock, the descent into them being just large enough for a man to go down; but they grow larger as soon as the person is in, and are usually square, from thirty to forty feet in diameter. In those the great men of the country prefer their corn; they first cover over the floor with straw, then they lay on the corn, fill, as the heap rises, placing a thin bed of straw between the corn and the fides, as they did at the bottom. In this manner they proceed till the whole cavity is filled: when this is done they cover the mouth or entrance with a fort of hurdle of green boughs of trees, interwoven one with another. This they cover with about two feet thickets of mud, and over this a hill of earth, well beaten together, in order to throw off the rain and sun in both ways, that none may settle on the place and soak into the magazine. The corn thus stored up keeps three, four, or more years very good; and, not infrequently, the proprietor being taken off by the severity of the eastern governments, under which they live, the magazine is forgotten, and some accident discovering it many years afterwards, the corn is almost always found perfectly good in it. All the care they take, in regard to the grain, is to expose it two or three days to the sun's heat, to dry it thoroughly, before they carry it into the magazine.

It may be stated further, that in the duchy of Lithuania, and in the Ukraine, the people also preserve their corn in the same manner, in wells or pits made in dry places: but in these countries great care is to be taken in the opening of these floor-rooms: for, if people descend into them before they have had sufficient communication with the fresh air, they are often killed by the damps; this, however, is easily guarded against. By these, and numerous other infallibles of the practice of other countries, it appears evident that subterranean granaries may occasionally be highly useful for the purpose of preserving grain in particular situations and circumstances.

But the common granaries may, with proper care, be rendered much more useful than they are at present. The grand caution necessary to this purpose is, to guard against the too great humidity, which is often the case in places where there is a great number of doors and windows. A too free access of the external air is also to be guarded against; as this has not only a tendency to produce the above effect, but is liable to bring in with it the ova or eggs of a number of different insects, which prey upon and destroy the corn. A third caution is, when the corn is the produce of the country where it is preserved, not to fill the place with the crop of one place only, but to mix the harvests of two or more different provinces as may be, the one dry, the other moist, or otherwise differing as much as may be; thus the contrary qualities of the one may prevent the distillation of the other. These are the principal rules to prevent the corrupting of corn: but when the mischief once begins, it will be very difficult to stop it; all the care that can be employed should, of course, be taken in regard to these as speedily as possible.

It may be observed, that the chief points to be attended to concerning the erection of granaries are to make them sufficiently strong, and to give them such a situation as may afford them to the most drying winds. But in constructing a granary merely for the accommodation of a farm, it is unnecessary, Mr. Bateson observes, in the second volume of Communications to the Board of Agriculture, to attend to all those circumstances respecting situation, &c. which ought to be observed in building an extensive granary, where large quantities of grain are sometimes demanded. A farmer seldom wishes to have a great deal of his threshed corn on his hands at once; nevertheless there ought, on every farm, to be a place of security, capable of containing, at least, one-third or one-half the grain produced, if necessary.
duced annually on the farm. Where the practice of housing corn is followed, there is little or no room, he remarks, within the barn for a granary; but where this is not the practice, particularly where there is a threshing mill, the granary may be easily made over the barn; which, with proper tackle for hoisting the sacks from below, is, he thinks, the most convenient and least expensive place a farmer can have it in.

The ordering of the corn in many parts of England, after being separated from the chaff, dust, and other impurities, and well screened, is: after bringing it into the granaries, it is spread about half a foot thick, and turned from time to time, about twice in a week; once a week they also repeat the sifting. This sort of management is continued two months, and after that it is laid a foot thick for two months more, and during this time turned once a week, or twice, if the season be damp, and now and then again sifting over. After about five or six months, it is raised to five or six feet in thickness in the lofts, and then turned once or twice in a month, and sifting now and then. When it has lain two years, or more, it is only turned once in two months, and sifting once a quarter; but how long forever it is kept, the oftener the turning and sifting are repeated, the better the grain will be found to keep. It is proper to leave an area of yard wide on every side the heap of corn, and other empty spaces, into which it may be turned and toiled as often as there may be occasion.

ToKent they make two square holes at each end of the floor, and one round in the middle, by means of which they throw the corn out of the upper into the lower rooms, and so up again, to turn and air it the better. Their scones are made with two partitions, to separate the dust from the corn, which falls into a bag; and when sufficiently full, this being removed, the pure and good corn remains behind.

By these means corn has been kept in granaries thirty years; and it is asserted, that the longer it is kept the more flour it yields, in proportion to the corn, and the purer and whiter the bread is, the superfluous humidity only having been evaporated in the keeping. At Zurich, in Switzerland, it is said that corn has been kept eighty years, or longer, by the same methods of management.

It is stated that the public granaries at Danzick are seven, eight, or nine stories high, having a funnel in the midst of every floor, to let down the corn from one to another. They are built so securely, that, though every way surrounded with water, the corn contracts no damp, and the vessels have the convenience of coming up to the walls for their lading. The Russians prefer their corn in subterranean granaries, of the figure of a sugar-loaf, wide below and narrow at top; the loaves are well plastered, and the top covered with stones. They are very careful to have the corn well dried before it is laid into these storehouses, and often dry it by means of ovens, their summer dry weather being too short to effect it sufficiently for the purpose.

Different contrivances have been proposed by M. Du Hamel and Dr. Hales, for ventilating or blowing fresh air through corn laid up in granaries or ships, in order to preserve it sweet and dry, and to prevent its being devoured by weevils or other insects. This may be done by nailing wooden bars or laths on the floors of the granary, about an inch distant from each other, when they are covered with hair-cloth only; or at the distance of two or three inches, when coarse wire-work, or basketwork of oyster, is laid under the hair-cloth, or when an iron plate full of holes is laid upon them. These laths may be laid across other laths, nailed at the distance of fifteen inches, and two or more deep, that there may be a free passage for the air under them. The under laths must come about six inches short of the wall of the granary at one end of them, on which end a board is to be let edgewayes, and framing against the wall: by this disposition a large air-pipe is formed, which, having an open communication with all the interstices between and under the bars, will admit the passage of air below forcibly through a hole at the extremity of it, into all the corn of the granary, that will consequently carry off the moisture evolutions of the corn. The ventilators for supplying fresh air may be fixed against the wall, on the inside or outside of the granary, or under the floor, or in the ceiling; but wherever they are fixed, the handle of the lever that works them must be out of the granary; otherwise the person who works them will be in danger of suffocation when the corn is fumed with brimstone, as is sometimes done for destroying weevils. Small movable ventilators will answer the purpose for ventilating corn in large bins or in small granaries, and may be easily moved from one bin to another.

If the granary or corn-ship be very long, the main air-pipe may pass lengthwise along the middle of it, and convey air, on both sides, under the corn. In large granaries, large double ventilators laid on each other, may be fixed at the middle and near the top of the granary, that they may be worked by a wind-mill fixed on the roof of the building, or by a water-mill. The air is to be conveyed from the ventilators through a large trunk or trunks, reaching down through the several floors: to the bottom of the granary, with bunching trunks on each floor, by means of which the air may be made to pass into a large trunk along the adjoining cross walls: from these trunks several leffer trunks, about four inches wide, are to branch off, at the distance of three or four feet from each other, which are to reach through the whole length of the granary, and their farther ends to be closed: clamps of one-tenth or one-twelfth of an inch are however to be left open at the four joinings of the boards, where they are nailed together, that the air may pass through them into the corn. In some of these leffer trunks there may be flitting shutters, in order to flow the passage of the air through those trunks which are not covered with corn; or to ventilate one part of the granary more briskly than others, as there may be occasion. There must also be wooden shutters, hung on hinges, at their upper part, so as to shut close of themselves; these must be fixed to the openings in the walls of the granary on their outside: by these means they will readily open to give a free passage for the ventilating air, which ascends through the corn, to pass off, but will instantly shut when the ventilation ceases, and thereby prevent any dampness of the external air from entering: to prevent this more fully, the ventilation should be made only in the middle of dry days, unless the corn, when first put in, is cold and damp.

But in smaller granaries, where the ventilators must be worked by hand, if these granaries stand on ladders, so as to have their lower floor at some distance from the ground, the ventilators may be fixed under the lower floor, between the ladders, so as to be worked by men standing on the ground without or within the granary. A very commodious and cheap ventilator may be had for small granaries, by making the door of the granary serve the purpose, which may be easily done by making a circular screen, of the size of a quarter of a circle, behind it; but in order to this, the door must open not towards but outwards, of the granary, so that, as it falls back, it may be worked to and from in the screen; which must be exactly adapted to it in all parts of the circular side of the screen, as well as at the top and bottom.
GRANARY.

Bottom. But there must be a step at about eight or ten inches distance from the wall, to prevent the doors falling back farther, that there may be room for a valve in the screen to supply it with air: which air will be driven in by the door, through a hole made in the wall near the floor, into the main air-trunk, in which there must be another valve over the hole in the wall, to prevent the return of the air from within.

But with the view of facilitating the labour of frequently stirring and ventilating the grain, and of lessening the expense of such buildings, a member of the Society for the Encouragement of Arts, Manufactures, and Commerce, in a letter to Dr. Templeman, recommends a new-invented granary, of which the following description is given. It consists, he says, of seven stories of floors, and may be built of any dimensions, provided proper proportions are adhered to.

The form of it is square, supposing fourteen feet square, within the rooms or cells. The distance from the floor of one cell, to the floor of that above, is five feet; and the whole building should stand on strong posts, more or less in number, according to the dimensions, at the distance of six feet from the ground. The small staircases, or rather ladders, to go to the several cells, must be fixed on the outside of the building, with a leading rail, or rope, to prevent falling. The whole granary to be built of what is generally called brick noggin; that is, it is first framed in strong timber work, and the interlaces filled up with brick. The floors, beams, and joists, are to be made strong to bear the weight of the corn; and the inside of the cells well lined with dry oak-board, close jointed, and the outside weather-boarded, the boards being strongly nailed to the timberwork of the frame, and afterwards payed over with pitch. The floors of the cells are to be contrived, as to slide towards the middle, in which part is to be an aperture six inches square, to be opened or closed by means of a sliding shutter, which must have a long handle, reaching in a groove, without the granary. On three sides of the rooms there should be windows strongly latticed, covered with wire, to keep out large insects and birds, and with strong shutters, to defend the corn from the weather. On the fourth side is a door to each room, to open from without. The windows are to be small, and as close as possible to the sieving. Over the upper room or cell in a loft, on the outside of the door of which is fixed a crane, to be worked within by a winch and siefers. The use of the windows in the sides of the rooms, is to give the corn all the benefit it can receive from the wind and fresh air. The door, when the cell is empty, admits the workman to sweep, dust, and clean it. The method of managing corn in this fort of granary is as follows: when the wheat is properly cleaned, it is hoisted in sacks to the loft above, and emptied through a hole for that purpose in the floor. The apertures in the floors of the cells being all open (except the two undermost, which are closed by the latticing shutters), the grain falls through till it reaches the undermost cell but one: when this is filled to the height of about two feet, which may be seen through the windows, the aperture in the floor of the next cell above is shut by its slider. This being filled in the same manner, the next above it is also shut, and so on till the whole are filled, if required, except the undermost, which is left empty. In this condition the corn is left for a week or more, if it was got in very dry. When it is to be stired, the floor of the undermost cell is to be swept very clean, the door is again shut, and the slider in the floor above drawn back, which allows the corn to fall through into that cell. When the cell above is empty, the slider is again shut, the floor swept very clean, and the slider in the next floor over that is opened. In this manner they are all managed, till at last the uppermost cell remains empty; and the window having all been open while the corn was falling from one cell to another, renders great benefit thereto, by admitting a current of air to pass through. Under the aperture in the floor of the lower cell, a proper screen is fixed; at the end of this screen is fixed a conductor or spout, to which a sack is hung, its bottom resting on a Miller's hand-barrow; the slider is then drawn, and the corn let fall on the screen, from which it runs into the sack; when the sack is full, the slider is for a moment shut, till another sack, on another barrow, is put under the conductor; the workman then wheels the first sack to the outside of the granary, and, fastening the crane rope to it, it is drawn up by another workman in the loft. The same method is pursued till the lower cell is emptied. If it is necessary to screen all the corn at this time, a small screen is fixed under the aperture of the next cell to be emptied, so contrived, as to have a box at the back of it for receiving all the dust, feeds of wood, &c. that pass between the wires; and this screen is facefully fixed under every aperture as the cells are facefully emptied. After the first month the corn need be stirred in this manner only once a fortnight, and after the first six months, only once a month, unless the weather is foul, and prove in autumn very hot and damp. The advantages of this granary, as described by the inventor, are, that it is built at a small expense; that it contains a great deal of grain in a small compass; and that the grain is easily stirred and ventilated, without the tedious mode of turning it with freshels, or other similar means.

However, the plan of a granary, taken from one built on his own estate, by a very repectable and intelligent gentleman in Cheshire, who has found it to answer extremely well, it is conceived, by an able writer, will perhaps be preferable to the above, not only from its cheapness, but from its simplicity, and the easy mode by which the whole body of grain is stirred, and the air conveyed and circulated through every part of it, at whatever thickness or depth it is laid, and one floor only is necessary, however high the building may be.

There can be no doubt, but that a granary of this nature may be very useful and convenient in many cases.

This fort of granary is shown in Plate Granary on Agriculture, in which fig. 1. displays the front elevation of the building: a is the door into the lower part; b, the door into the loft above, to ascend to which a ladder is necessary; c, a crane for hoisting sacks up from below; d, d, d, are air-holes for ventilation. At fig. 2. is seen a section or view of the infide of the building: d, e, d, e, are wooden spoles, which reach from the air-holes on one side of the granary to thole on the other. These spoles are formed of inch deal, about six inches broad, and made with an angle simial to those spoles that are employed to convey off the rain water from the eafings of houfes. They are placed acrofs the granary with the angle upwards, as represented at fig. 3; b, b, b, are the ends of similar spoles, which crosses the others, and also reach to the air-holes on the other sides of the building, as seen at fig. 4; e, e, e, are half spoles, extending in the fame manner to air-holes on each side. It is necessary that the air-holes should decline outwards, in order to prevent the entrance of rain or snow in stormy weather; and they should likewise be secured from insects and vermin by wire cloth: d, d, the floor of the granary, which is three yards square, and divided each way into three hoppers, c, c, c, of one square yard each, making in the whole nine hoppers, as seen at fig. 5; f is a large hopper, that encompasses all the left, and has a slider at g for opening occasionally, as may be necessary in taking out the grain. And there is another smaller hopper h, which is supended to this by four iron halps.
HALPS, I, L, &c., that may be readily unfastened when required, from the square deal box a, e, fixed to the large hopper. Through the side of this box, the handle b of the lid must extend. This hopper is principally used for the convenience of taking out a small quantity of grain, but is removed when a large quantity is to be taken from the granary; as is a small loft, into which the sacks of grain are located, and emptied over the sides or rails m, n, from which it falls down, and passes through the hopper a, c, till f is filled (the sides g being closed); and as the corn continues to be emptied from the loft, the granary is gradually filled until it is up to the top if necessary. The spouts being all inverted, as noticed above, and open below, it is obvious that, although the granary is filled to the top, the corn will not, like a fluid, rise within the spouts above the level of their lower edges; and thus there will be a vacuum left within every spout, through which the air will freely pass. These spouts are placed three feet distant from each other, horizontally from angle to angle, and eighteen inches vertically; that is, from those in one tier, to those in another, which is the next, and crosses it. The holes in the bottoms of the hoppers a, c, f should be so proportioned, that one may not give vent to the grain faster than another; for which reason, the aperture of the middle one a, fig. 5, should be the smallest, because there is the least obstruction there. The apertures b, k, k, k, ought to be of somewhat larger, as the grain will meet with some little obstruction there by the sides of the large hopper; and the apertures or openings g, c, c, should be the largest, as the obstruction in the angles will be greater than in any other part of the work.

GRANASUOLA, in Geography, a town of Italy, in the department of the Amona; 6 miles N. of Faenza.

GRANATAN, a town of Saxony, in the circle of Erzgeburg; 12 miles N. E. of Freiberg.

GRANATARUS, in Middle Age Writers, an officer in monasteries who took care of the provisions.

GRANATE, popularly called garnet, in Natural History. See Garnet.

GRANATE Pegle. The counterfeit garnet in pails, is formed with three different proportions of the ingredients, which are these:

Take prepared crysall two ounces, common red-lead fix ounces, manganic hemten grains, zaffer three grains; mix all well together; and put them into a crucible; cover it with a lid, and let it in a potter's kiln for twenty-four hours.

Or, take crysall two ounces, minute five ounces and a half, manganic fifteen grains, zaffer four grains; mix them well together, and leave room for their swelling in the pot; bake them twenty-four hours in a potter's kiln.

The last method is this: take crysall prepared two ounces, minute five ounces; mix them, and add manganic fifty-two grains, zaffer fix grains; mix them well together, and let all be baked, in a pot well luted, in a potter's kiln for twenty-four hours.

The first of these makes a very hand some garnet of the common tinge; the second, a deep one, with something of a violet tinge, as many of the natural garnets have; but the third makes much the bright and brightest. Neri's Art of Glass, p. 134. See Glass and Paste.

GRANATINE, a name given by Kirwan to several triple compounds, properly of the granite kind; but as it includes also combinations that have no more than one external ingredient of granite (such as the combination of quartz, jade, and garnet), it is obvious, that many rocks, thus united into one class, are far from giving all the characters of granite compounds.
the year 1697. The leisure which his diplomatic functions allowed was employed in translations of Voyages and Travels from the Portuguese. In 1702 he accompanied the same minister in Spain, where he remained about two years as secretary. Soon after this the marquis de Torci, minister of state, took him into his service, and employed his pen in drawing up several memorials concerning the Spanish monarchy, and other political topics, in which he was of great use to his patron, and acquitted himself with great ability. As an author his last printed work was a treatise

"On the Succession to the Crown of France." This was given to the world in 1718, and is reckoned a curious and useful performance. He died at the age of 86 in the year 1713. He had been published of church preferment, and had held, for a time, the office of censor royal of books. Morei.

**Grand.** In Geography, is a denomination applied to a variety of places, as in the following instances.

**Grand Alps,** or Jura, a well-built town in the western part of the island of Hispaniola; the road of which is so bad, that vessels, in order to escape the wind, are compelled to take shelter behind Cape Donna Maria. N. lat. 18° 15'. W. long. 74° 5'.

**Grand Bay,** a bay on the S.W. coast of Newfoundland, somewhat S. of Cape Ray.

**Grand-Bourg-Saléguas,** a town of France, in the department of the Creuse, and chief place of a canton, in the district of Guéret. The place contains 2525, and the canton 7885 inhabitants, on a territory of 215,000 square feet, in eight communes.

**Grand Canal, in Ireland,** is an establishment of which we have given some account in our article **Canal,** and have here to correct an error which crept into that account, in stating that the canal terminates in the Shannon at Termonbarry, instead of Shannon-harbour, two miles above Banagher. The branch to the Barrow joins that river at Athy; with a collateral branch from Low-town near Mountain to Portarlington.

When the new part of the canal was finished in 1834, from Tullamore to the Shannon, a general repair and deepening of the old parts took place, in which 5000 men were employed for expedition, and the whole line was squared out, so that 60 ton boats might pass. At Tullamore there are wharfs and warehouses for goods, and also at Shannon-harbour, with inns and other accommodation for persons on business.

The Doonare and Boulavoune celleries in Queen's county, belonging to this company, were in February 1809 worked by 100 men, and they advertised for 200 more, in order to work 100 acres of a coal field three feet thick, which had then recently been laid dry: the canals and river navigations admitting of their being conveyed to Dublin, Limerick, Waterford, Athlone, &c.

Kildare aqueduct, eight miles from Dublin, is 100 feet high, according to M. De Luce, *Geology,* p. 320.

**Grand-Champ,** a town of France, in the department of Morbihan, and chief place of a canton, in the district of Vannes; seven miles N.N.W. of Vannes. The place contains 4139, and the canton 7850 inhabitants, on a territory of 205,000 square feet, in four communes.

**Grand-Couronne,** a town of France, in the department of the Lower Seine, and chief place of a canton, in the district of Rouen. The place contains 8000, and the canton 12,793 inhabitants, on a territory of 182,000 square feet, in 13 communes.

**Grand-Fathers,** several large detached mountains of America, in the S.E. corner of Tenefice, in which are the head-waters of French Broad, and Cataba rivers.

**Grand Fort, a town of Africa, on the Slave Coast.**

**Grande Iland,** an island in the Atlantic, on the coast of Brazil; 16 miles long and two broad. S. lat. 23° 15'.

**Grande Island,** an island of America, in Lake Superior, on the N. side of the lake. — Also, an island in Niagara river, about six miles long and three broad; its S. end is four miles N. of Fort Erie. — Also, an island at the mouth of lake Ontario, within the British territories; 20 miles long and at its greatest breadth four miles.

**Grande Isle,** a new county of America, in the N.W. corner of the state of Vermont, incorporated in 1825, and including the towns of North Middle and South Hero, Vineyard (late Isle Moree) and Alloette.

**Grande Ile,** two large islands in lake Champlain, each about eight or ten miles long, and forming a township belonging to Vermont.

**Grand Junction Canal.** To the full account which we gave of this very important inland navigation in our article **Canal,** we have here merely to add a few particulars which have occurred since that account was printed. The act of the 5th Geo. III. for the Grand Union canal provides, that a canal with locks is to be substituted for the railway-branch from Cayton to Northampton, in order to open a communication by water, from the head of the new navigation, the design for the continuation of the Leicester and Northampton Union canals further south than Market Harborough, where it now terminates, being dropped, in consequence of the adoption of the Grand Union above-mentioned, which will connect the above canal with the Grand Junction. The three aqueduct arches over the Ouse at Wolverton having been made flat elliptical, instead of the curves of equilibration, and the foundation also insufficient, they gave signs of great insecurity immediately on their centres being struck, and in February 1808 two of them actually fell in and emptied the canal, as far as the flupgates; fortunately, the old line of locks across the valley had not been disturbed, and the trade has suffered no interruption in consequence. A cast-iron aqueduct on brick and stone piers is now building for these three arches, under the direction of Mr. Benjamin Bevan, who is now the engineer to the company. In 1807 a new referror was completed near the side-ponds on the northern side of the Tring summit, for supplying water to the locks below the side-ponds in dry season.

In examining the strata and springs on the north side of the chalk summit, between Tring and Wendover, with a view to better supplying the Wendover branch and summit-level with water, Mr. Bevan discovered, that different water-tight beds in the lower canal held up springs a considerable height above the canal, owing to their dip to the southward; and in order to avail himself of this water, a Tough or tunnel was begun in the upper bank of the canal near Wendover, and has been driven about half a mile southward, intersecting different strata of chalk from beneath, and increasing in its supply of water as it proceeded; but observing that the principal vent of this water was in the winter and early spring months, when the other sources were more than sufficient for the supply of the canal, it occurred to that ingenious gentleman to place a strong and water-tight valve in the most favourable part of this tunnel, which, as soon as the autumn as the canal is amply supplied from its other feeders, is shut, and kept so, until thee begin again to slacken in their supply; the water in the immense plumes of these beds of chalk, in the mean time accumulating, as in a vast subterranean reservoir, the springs rise to the level which they originally did before this tunnel was begun, about 20 feet above the canal; and for many weeks after
after the opening of the valve, in the beginning of summer, they pour forth a most surprizing stream of water into the canal, which otherwise would have vested miles off in the chalk valleys, or slowly have made its way down through the joints and fissures in the strata to springs at the bottom of the chalk, which vent below the level of the canal.

In 1808 a twelve-horse single Bolton's steam-engine was erected near Nuth-mill, in Hertfordshire, to lift the water again, the rise of four locks, for better supplying the mills during seven or eight months of the year. The company, in 1806, caused boats to be fitted up for conveying fat sheep alive, in tiers one above another, from distant places in the county, to the London markets, instead of fatiguing them by driving along the roads, the scheme of thus bringing oxen having been previously tried, and found not to answer; but after a fair trial, the expenses were found to over-balance the advantages expected from this also; we are sorry to add, that the cattle-market at Paddington has failed, and that the pens erected for it by the company have been sold and removed.

The limited quantity of coals brought to Paddington, or within 20 miles of this canal by this, now pay a duty of 10c. 9d. per ton (of 20 cwt. 11 lb.), which is equivalent to the duty on Newcastle coals in the Thames: in consequence of this heavy and opprobrious duty, many waggons and carts are employed in fetching coals by land, from the next wharf beyond the limited distance, near Watford. The Grand Union canal above-mentioned is begun, and is to join this canal near the S. W. end of the Braunston tunnel. The design of a branch from near Tring, through Aylesbury and Thame, to the Thames and it's navigation and Wilts and Berks canal near Abingdon, has been again revived, and it seems probable, that an act for that purpose will pass in the ensuing session of parliament (1811). Towards supplying water to the inhabitants near Paddington, a transfer of the company's rights has been made to a separate water-company, which is expected to be confirmed by parliament in the ensuing session.

In November 1826, the company declared the first half yearly dividend of 1½ per cent, on the original shares, which has regularly increased to 3 per cent., half-yearly, exclusive of property tax. The affairs of the company seem now fast retrieving from the effects of their great mismanagement for many years after its establishment, and to be now in a very prosperous state; the shares (of 100l.) were, in September 1815, reported to be currently sold at 30l. each! although, at one period, the fame could with difficulty be disposed of at 65l. to 70l. each: such are the effects of good or bad management, and of abilities and integrity in those entrusted with the direction and management of an immense concern like this, in inspiring confidence in commercial men to enter into trade and speculations connected with the canal, and in capitalists to invest their money in the company's shares. A resolution of the general assembly of proprietors, on the 7th of June 1803, for appointing a general superintendent of their concerns, principally led to this beneficial change. On the 11th of June following, Charles Harvey, esq., was appointed to this office by the committee, and, after much opposition from certain powerful individuals, was, on the 11th of July, confirmed therein, by a general assembly called for the special purpose.

**Grand Key, a small island among the Bahamas.** N. lat. 26° 54'. W. long. 77° 48'.

**Grand Lacs, a lake of Louisiana.** N. lat. 32°. W. long. 93° 3'.

--- Also, a lake in the province of New Brunswick, near the river St. John's, said to be 30 miles long, eight or ten broad, and in some places 40 fathoms deep.

**Grand Luce, Le**, a town of France, in the department of the Sarthe, and chief place of a canton, in the district of Saint-Calais; 14 miles S.E. of Le Mans. The place contains 20,435, and the canton 10,493 inhabitants, on a territory of 2,717 kilometres, in 8 communes.

**Grand Menen Island,** an island of the Atlantic ocean; 6 miles S. by S.E. of Campo Bello island, opposite to Papanaquoddy bay on the eastern border of the United States.

**Grand Ridge,** is a term often used, (see our article CANAL,) for the water-head, or summit line, across an island or continent, from whence the rain waters fall by opposite courses to the ocean. It results from the admirable system of valleys, which the great Creator has spread over the whole face of the earth, having no part, perhaps, originally of the surface, without a decent and out-fall to the sea; that the ridges, or summit-lines, form a system not less beautiful and perfect than the valleys; and whence it happens, that, from any hill whatever, it is practicable to mark on a good map, and to travel to every other hill in the same island or continent, however large, without crossing any running water, however small, but constantly to pass along a ridge or waterhead; whence the waters on the surface fall opposite ways from your route. It seems surprizing, that no one has attempted to illustrate this subject by a good map, shewing all the connections and windings of these ridges in England, or even any local district, until of late, that Mr. Farley has prepared a square of map, including Derbyshire, shewing the ridges, and the situation of all the hills and principal eminences upon them, which is intended to accompany his report to the Board of Agriculture on that interesting district.

The triangular form of the British island, and the situation of the two principal rivers, the Thames and the Severn, (or rather the Bristol channel,) occasion the grand ridge of England to divide into two branches on the Chalk Downs, a few miles N.E. of Devizes; one of which, (the south-wester,) proceeds to Runway-how, and crosses the deep cutting of the Kennet and Avon canal, near to Devizes, near Elst Lavington, Warminster, Wincanton, Beamfnite, Crewkerne, Chard, &c. by a most circuitous route, passing almost to the north and to the south coasts alternately, until it reaches the Land's End in Cornwall; having, in this long route, probably deflected to no lower strata than the red ground or marl, of which we shall speak further presently.

The other, or south-eastern branch of the grand ridge, proceeds along the chalk and the clays and sands above it, across the deep-cutting of the Kennet and Avon canal, near Burbage, by High-clere, (near which it probably occupies the highest stratum in the whole British feries,) near to Alton and Haslemere, when it soon descends off the chalk into the great southern demudation, (see Philosophical Magazine, vol. xxxv. p. 130,) and pursues the under meanders, through the wealds of Sussex and Kent, by Alford, Leith-hill, Hands- crofts, (on the London and Brighton roads, being there on the lowest stratum but one which appears in that road,) by Turner-hill, Nutley, Crowborough, Rotterfield, Wadhurst, Tenter-den, Shadowshurll, Lyme (near Hythe), where it again ascends the edge of the chalk, and proceeds on it by Padlef- worth, Swiegfield, and Lydden, to the coast at King's Down, near Walmer castle.

From the point of branching, N.E. of Devizes, as above described, the grand ridge follows the chalk northward by White-horse hill, near Cherhill, &c. till within a few miles of...
of Swindon, when it turns to the N.W., and descends to the marle, and other strata below the chalk, crossing the Woburn sand flintstratum, not far from Wootton-Bailey; and passing to the Bath free-stone range, it crosses the Salperton tunnel, on the Thames and Severn canal, and proceeds near to the western edges of the fame strata, by Charlton-Kings, near Cheltenham, Stanway-hill, Broadway-hill, Lemington-hill, Long-Compton-hill, and Epwell; soon after which, the grand ridge begins to leave the free-stone, and take to the dark blue clays, &c. under it, except cropping some points of the flint, and traverses the Fenny-Compton tunnel, on the Oxford canal; thence by Holllidon, and near Daventry, it crosses the Braunton tunnel, on the Grand Junction canal, at Well-Haddon, and at Husband's-Bosworth, the tunnels of the Grand Union canal; when, turning north-west, the ridge paffes Gilnorton; and not far from Lutterworth it crosses the Lias clays and limestone strata, and descends to the red marle (above mentioned), and quickly, by a great fault, or sudden lift of the strata, is brought upon the coal-measures of the Bedworth-field, and crosses the deep cutting of the Coventry canal, through Bedworth town, across the late sir Roger Newdigate's canal, and sweeps round to the west, south-west, and south, to Kenilworth; when, having crossed another fault, and got again upon the red marle, it crosses the deep-cutting of the Warwick and Birmingham canal, near Baddesley-Clinton, and of the Stratford canal, near Hockley; thence by Ashby-heath, and crosses the Well-heath tunnel of the Worcestershire and Birmingham canal, and the Lapal tunnel of the Dudley canal; after which, the grand ridge crosses the bathatic hills between Rowley and Dudley, (which belong to the red marle strata,) and, descending to the coal-measures, crosses the Dudley tunnel N.W. of that town, and proceeds by Sedgley; then cropping an erect and demoted patch of the yellow lime-flint, it crosses the deep-cuttings of the Old Birmingham canal, the WVley and Ellington canal, and of the Staffordshire and Worcestershire canal, all near Wolverhampton town; then by Tatterhall, Wrottesley, Blnnhill, Cowley, Wootton, (near Eccleshall, Broughton, Ashley, Maer, Madeley-park, to Keele, (near Newcastle-under-line,) where it has again got upon coal-measures, by Bignole-hill, and across the Harcastle tunnel, on the Trent and Mersey canal, by Golden-hill, Wickinniton rocks, and, cropping an immense fault, descends to the lime-flint shale, (see Mr. Farey's section in Plate II, vol. xxxii. of the Philosophical Magazine,) on Biddulph Moor; thence paffes the top of the Great Rudyard revoir, to Gun-hill, and cropping to High Roches rocks, it there ascends the first grift; then crofes a small trough of the first coal-hall and second girt, and descends again to the first grift, or Ramshaw rocks, and still further, on the lime-flint shale, at the Royal Cottage, along which it proceeds to the N.W. side of Flash, and thence ascends the first grift again, on South-Axeedge-hill; it again descends to the lime-flint shale in crofing Middle and Great Axe-edge-hills; from whence it ascends across the first grift and first coal-hall, and ascends the second grift on Thatch Marsh; this it pursues to the north of the Macclesfield and Buxton road, and then turning N.E. again descends to the lime-flint shale, and follows it across the Mancheffer and Buxton road; soon after, it ascends the first grift and first coal-hall, on Combs's-mot, and again descends to the shale, paffes Sittinglow, (11 mile S.E. of Chapel-en-le-Frith,) when, turning eastward, it crofes the Great Lime-flint fault, (N. of Dove-holes,) and is found upon the third lime-flint, on which it crofes the quarries and rail-way of the Peak-Forest canal; soon after, it paffes over the bafliff-edge of the third coal-hall, and descends to the great fourth lime-flint in Peak-Forest, which is probably the leaffit flintstratum, to which the grand ridge paffes in its route through England; this lime-rock having been estimated to be four miles at leaff of perpendiculur thicknefs below the top of the chalk, from whence we commenced our defcription; much the greater part of this vaft series of flata having in this route along the grand ridge been loft suddenly by perpendicular lifts of the flata or faults, which, in proceeding to this point by more favourable routes, might have been seen baffling in effection. For about one and a half mile the ridge proceeds upon the fourth lime, then again paffes a point of the third coal-hall and third lime, to the village called Sparrow-pit, in the Mancheffer and Caflerton road, where it again crofes the great fault and descends to the lime-flint-hall on Rudhop-edge, whence it proceeds northward, and after crofing the Badele-road from Hayfield to Edale-chapel, it paffes the firt grift on Edale-rock, and proceeds across the moifes on Kinder-scout hills; thence it leaves at their N.W. corner, and crofes the moifes on the flade, and the ancient Badele-road called Doctor-Gate, from Glossop to Ashop Dale; it then paffes the firt grift again on shelf-flones, and follows the fame to Wain-flones and Blakele-low-flones, which seems to be the fift and land in Derbyshire, it then paffes N. E. by Round-hill, and descends to the firt coal-hall, crofes the Mancheffer and Penifone-road at Lady-crofs; where, turning N. W. it paffes the fcond grift rock, and proceeds by Dean and Brethand Edges, to crof the Glossop and Huddersfield road, on the bags upon this rock on Holme moifes; from hence the ridge, after fome dilance, again descends to the firt coal-hall, the firt grift, and to the lime-flint-hall, crofing the Stange tunnel on the Huddersfield canal near Marleton; the ridge then proceeds across Black-flone-edge, and crofes the deep-cutting of the Rochdale canal near the village of Hun dersfield, (which has improperly been laid in the population accounts of 1801, to be a town containing 1,671 perfons,) the ridge then paffes Holme on the Barley and Halifax road, whence it proceeds, and near Colne comes again upon coal-measures, which are, however, loft again at the great fault, in which part of the Fourfride tunnel on the Leeds and Liverpool canal was driven, and which occasioned the extraordinary trouble and expense attending that tunnel, which is mentioned in our article CANAL. From hence the grand ridge proceeds, by Barnoldwicke, West Marton, near the Cold-Combror, E. of Settleton lime-flone, over Pen nigator-hill, Snares-felt, Nine-Varlands, Kelton-fell, Lane forest, Scordal-head, Milburn-forcid, Aldinton-moor, (line), Hartide-crofs, Gelflake-forcid, Talkin, and crofes the Roman or Psits wall on the E. side of Upper Denton, and foon after it enters Roxburghshire in Scotland; through which it is much easier to trace this grand ridge than in England, it forming often the boundaries between the Scotch counties, to which this ridge and its collateral ridges are much better adapted than the rivers and brooks, which have generally been chosen as boundaries, both as being more permanent, and not liable to the changes which streams of water are undergoing in the bottoms of vales, and avoiding those disputes respecting, and the delay of making and improving bridges, fords, navigations, mills, &c. owing to the rivers being part in one county and part in another, and by which also many of the moft consider able towns are split into two or more counties, to the no small inconvenience of their inhabitants, in judicial and other county matters.

Grand River. See Ottawa and Ouse. — Alfa, a river of Africa which runs into the Indian sea. S. lat. 2° N. 41 —Alfa.
—Also, a river of Sicily, which runs into the Mediterranean on the N. side of the island, N. lat. 38° 3'. E. long. 14° 54'.
—Also, a river of America, which discharges itself into Lake Michigan, N. lat. 43° 25'. W. long. 82° 55'.—Also, a river of America, which runs into Lake Erie, N. lat. 41° 55'. W. long. 81° 8'.—Also, a river of Canada, which runs into the Detroit, N. lat. 42° 34'. W. long. 82° 32'.—Also, a river of Canada, which runs into the St. Lawrence, N. lat. 47° 3'.

**Grand River, or Rio grande, a river of Africa**, which runs into the Atlantic, near the Bificagos isles, N. lat. 14°, W. long. 14° 30'.

**Grande Soie, an Indiaman**, inhabiting a territory of the Miilion. and able to furnish 800 warriors.

**Grand Surry-Canal.** This canal is yet in the same state, nearly, as when our account of it in the article CANAL was written. In 1825, except that about two miles in length of it, at its N. E. end, has been brought into use, a work that the Croydon canal has been completed; and the dock for ships, at its entrance from the Thames, was completed and opened in June 1857, and has answered so well to the proprietors, that in the last session of parliament, they made an unsuccessful attempt to obtain power for a further extension of them. In February, 1859, this company determined on erecting a ten-horse steam engine on the banks of the canal, by the Deptford road, for supplying the neighbouring inhabitants with water, intending to let the surplus power of this engine to some manufacturers.

**Grand Traverse, a range of islands, consisting of huge rocks in lake Michigan.**

**Grand Trunk Canal.** A name commonly applied to the Trent and Mersey canal, which fee in our article CANAL.

**Grand Union Canal.** In the session of parliament, 1810. (50 Geo. III.) an act passed for making the Grand Union canal, the general direction of which is about S.W. 234 miles, in the counties of Leicestcr and Northampton, being considerably elevated, and crossing the grand ridge of the island twice, by tunnels, its middle part for about half its length skirting near to the ridge on its western side, and the two ends being on the eastern side of the ridge. Its objects are the completing of the long-defined water-communication between the Trent river and the many canals which connect therewith, in Derbyshire, Nottinghamshire, and Leicestershire, and the Grand Junction canal, and through it to the metropolis, without making the enormous circuit by Burton, Fradley-heath, near Litchfield, Tamworth, Atherstone, Nuneaton, and Braunstone, which at present goods, coming by water from Leicestershire, Nottinghamshire, and Derby must do; it is intended also to improve the necessary for the southern part of the Leicestershire and Northamptonshire Union canal, between Market-Harborough and Northampton, which on account of its difficulties has never been attempted; the present rail-way branch between the Grand Junction and Northampton is intended to be changed for a canal with locks, by which means the people of Northampton will have a water-communication with Market-Harborough, Leicestershire, &c. with only about 14 miles longer distance than the Leicestershire and Northampton Union would have been, if the same had been completed according to its original act. Market-Harborough and Daventry are the only considerable towns near the line of this canal, which commences in the Leicestershire and Northamptonshire Union canal near Gunley, and terminates in the Grand Junction canal near Buckby-wharf, near the S.E. end of the Braunstone tunnel. From Gunley 7 1/2 miles is a rise of 76 feet by 12 locks, and thence to Welford, 19 miles are level, then in 2 1/2 miles is a fall of 53 feet by eight locks, and thence to the Grand Junction canal about three miles are level; near Hubbard's Bosworth is a tunnel of about 1200 yards long, and near Crick another of about 900 yards long. Near Crick it is proposed to make a referrer of 66 acres above the canal, but below its level, so that the surplus water collected from other parts of the canal in rainy seasons can be here reserved, to be pumped up when wanted.

The width of the canal at top is 42 feet and 1/2 at bottom, and its depth of water five feet; the locks are 82 feet long and seven wide, calculated for 35 ton boats. This line was first surveyed by Mr. James Barnes in 1803, and by Mr. Benjamin Devan in 1809 and 1809, and the latter is appointed engineer for the execution of the work.

**Grand Western Canal.** To be denominated in an act which passed in the year 1796, as mentioned in our article CANAL, but under which no progress had then been made. In April 1812, it was reported, that a beginning had been made on the summit level, in Holcomb, Devon. A much larger canal, capable of conveying ships from the Bristol channel to the coast of France, has been some time in agitation, for avoiding the very circuitous and tedious navigation round the Land's End; which, however defensible, is scarcely practicable, we incline to think, for want of water.

**Grand Affife, in Laco. See ASSISE.**

**Grand Cape. See CAPE and ATTACHMENT.**

**Grand Centurion, E., an ancient book of very great authority, which contains the ducal customs of Normandy.**

**Grand Days. See Day, in Laco.**

**Grand Difuffs, dittrittio magna; a writ of difact, so called on account of its extent, which reaches to all the goods and chattels of the party within the county.**

This writ lies in two courts: either when the tenant or defendant is attached and appears not, but makes default; or where the tenant or defendant hath once appeared, and after makes default. On such occasions, this writ lies by common law, in lieu of a petit cape.

**Grand Elieir, grand, jury, bywret, prior, prior, of France, freemans. See ELIEIR, GUARD, &c.**

**Grand Guste, in Painting. See GUSTO.**

**Grande, in Geography, a town of Norway, in the diocese of Drammen; 21 miles N. W. of Drammen.**

**GRANDE is underlaid of a lord of the first rank or prime quality.**

In Spain, the term grandees is used absolutely to denote the prime lords of the court, to whom the king has once given leave to be covered in his presence: there are some grandees for life only; made by the king's favour simply, be covered. Others are grandees by descent; made by the king's favour, be covered for thyself and heirs. These last are reputed far above the former.

There are some who have three or four grandeeships in their family.

**GRAND-GOR.** A Scotch appellation for the venereal disease.

In the Philosophical Transactions, N 469. Sept. 5. we have a proclamation of king James the IVth of Scotland, ordering all who had this disease, or who had attended others under it, forthwith to repair to an island in the Firth of Forth. If the grand-gor was the posy, and this distemper came into Europe at the siege of Naples in 1494, it must have made a very
very quick progress to cause such an alarm at Edinburgh in
1492.
GRANDI, Enrico, in Biography, whom Vafari calls
Ercole da Ferrara, was a painter of the early ages in the
art after its revival. He was a disciple of Lorenzo Costa,
whom he afterwards surpassed in excellence, and at whose
death he was appointed to complete the work of the Crucifixion,
begun by the former for Domenico Garganelli, in
the church of St. Pietro in Bologna, by which he
achieved great reputation for the excellence of the colour, and the
truth and force of expression; although it is wrought in the
dry style of Mantegna and P. Perugino. When unhappily
the chapel was destroyed, that part of the picture
which was preferred was placed in the palace Tanara. His
peculiar style of manner made him many enemies in Bo-
logna. He therefore quitted it and went to Ferrara, where
he produced many works which are very scarce now. His
fondness for wine shortened his life, and he died at the age
of 40 in the year 1531.
GRANDI, Francis Lewis, who flourished in the latter
times of the 17th, and the commencement of the 18th
times, was born in 1671 at Cremone. He was dispossed to
a liberal life, and chose the profession of theology, in order
that he might freely indulge his inclination. He entered
into the religious order of Camaldolites, at Ravenna, at the
age of 16; and on this occasion he relinquished his own
Christian name, and received that of Guy. He became, in
the early progress of his studies, distinguished for his pro-
diciency in the different branches of literature and science,
and being dissatisfied with the Peripatetic philosophy of
the schools, he was ambitious of contributing to introduce a
more rational system. With this view he offered himself as
a candidate for the vacant professorship of philosophy in the
school of Florence, and obtained his object, though not
without the most determined opposition from the prejudiced
adherents to the old opinions. He now applied himself to
the introduction of the Cartesian philosophy, while, at the
same time, he became zealously attached to mathematical
studies. The works of the great Torricelli, of our country-
man Wallis, and of other celebrated mathematicians, were
his favourite companions, and the objects of his familiar
intercourse. He published a treatise to resolve the problems
of Viviani on the construction of arcs, which he dedicated
to the grand duke Cosmo III., who was so delighted with
the performance, that he appointed the author professor of
philosophy in the university of Pisa. From this time
Grandi pursued the higher branches of mathematics with the
utmost ardour, and had the honour of ranking the ablest
mathematicians among his friends and correspondents.
Of
the number may be named the illustrious Newton, Leibnitz,
and Bernouilli. By his life of St. Peter Damian, published
in 1702, and his examination of the legends of St. Romain,
he gave offence to the bigots of his community, and was
deposed from the dignity of abbot of St. Michael at Pià;
but the grand-duke had too liberal a mind to be offended;
and to shew the effusion in which he held the philosopher, he
immediately appointed him his professor of mathematics in
the university; which, perhaps, led to his re-instatement in
the abbacy. He now resolved some curious and difficult
problems for the improvement of acoustics, which had been
presented to the Royal Society in Dublin, and having ac-
complished his object, he transmitted the solutions, by
means of the British minister at the court of Florence, to the
Royal Society at London. The principal work of Le
Grandi was "A Treatise on Series and Infinitesimals." He
appeared likewise as the defender of Galileo's doctrine re-
specting the earth's motion, and obtained a complete victory
over those who opposed it. He was deeply versed in subjects
of political economy, and various disputes were referred to
his decision respecting the rights of estury, &c. He was
appointed commissioner from the grand-duke and the court
of Rome jointly, to settle differences between the in-
habits of Ferrara and Legnana, concerning the works
necessary to preserve their territories from the ravages of
invasion. For these and other important public services
he was liberally rewarded by his employers. Reverting to
his literary labours, Le Grandi engaged in a contest with
Le Ceva, on the subject of the philosophy of the ancients
and moderns. This diffusion was occasioned by a preface to
a Latin poem by Le Ceva, in which he maintained that
none but heretics would renounce the philosophy of Acri-
tote. The remainder of his life this great man spent in
mathematical pursuits, and in the publication of works of
science, which are too numerous to be recited here. He
died at the age of seventy-two in the year 1732.
GRANDIER, Urban, was born in the latter part of
the 17th century. His father, a notary-royal at Sable,
gave him a good education, and introduced him while young
among the Jesuits at Bourdeaux, to whose friendship he
recommended himself, as well by his natural genius and
understanding, as by his diligence and proficiency in his
studies. Conceiving highly of his talents, the fathers of
the college gave him the living of St. Peter, at Loudun,
of which they were the patrons, and procured him a prebend
in the church of the Holy Cross. These benefits rendered
him the object of jealousy with ecclesiastics, which was still
further heightened by the accomplishments of his person
and the elegance of his manners. With his friends he was easy,
facetious, and agreeable, but extremely haughty towards
those whom he regarded as his enemies. Some of his
brethren of the clergy he had exasperated, by the arrogance
with which he triumphed over them, upon gaining certain
suets in the ecclesiastical court, and he raised a host of foes
by his reported successful garrulities with the ladies, to the
great mortification of disappointed rivals, incensed fathers
and husbands. A league was formed with a view of driving
him entirely out of Loudun; a heavy charge of schismacy,
irreligion, and impiety was laid against him, in the bishops'
court of Poictiers, which produced, first, a sulpuration of
the priets' functions; and afterwards he was condemned to
relinquish his benefices, and to the practice of penance and
mortification. From a sentence to severe, Grandier appealed
to the archbishop of Bourdeaux, by whose means he was
acquitted, and even allowed to sue for the recovery of
damages, and the replevion of the profits of the benefices
during his sulpuration. The archbishop, a friend to peace,
carefully recommended him to change his residence, but he
was incapable of renouncing his favourite passion, revenge.
He returned to Loudun, bearing in his hand a branch of
laurel, and in his mind a fixed resolution of humbling his
enemies. They were equally bitter, and spurting under
the lash of the victor, they set about means to compass his
destruction. A priest, named Mignon, devised a plan, which
ultimately enabled them to gratify all their malice. He
trained up nuns in the Ursuline convent at Loudun, to act
the part of women puffed with evil spirits; these were
instructed to accuse, in their frantic fits, Grandier of
having seduced them to demonical influence. At first he
was indifferent to the reports, considering the calumnists as
a mere farce. It had, however, a mortal tragic conclusion.
Grandier, at length, finding, from the effects produced upon
the credulous devotees, that matters were taking a ferocious
turn, appealed to the magistrates, confessions of his own innocence,
and requesting them to take cognizance of the affair. They
began...
began the investigation, and were satisfied that the whole was the effect of trick, but when they attempted to interrogate their authority, and prohibit the continuance of such disgraceful proceedings, the priests who had patronized and instructed the women, and who were bent upon the destruction of Grandier, disowned their jurisdiction and defied their power. An application was made to the archbishop of Bourdeaux, who employed physicians to examine into the case, and by their report no doubts were left in the mind of the prelate, that the bufines was founded on the most gross and scandalous impudence. Upon this the archbishop issued an order, the necessity of which put the whole legion of devils to flight. After a time the scheme was renewed, and the authors of it contrived to engage cardinal Richelieu to favour their malignant designs. For this purpose the monks of Loudun wrote to father Joseph, one of their fraternity, informing him that Grandier was author of a farce, entitled "The Shoemaker's wife of Loudun," containing reflections on the cardinal's birth and person, which had excited in the bosom of the cardinal the sharpest tinges of resentment. Believing that the information was correct, he determined to make the farce feel the full weight of his vengeance. Grandier was arrested and brought to trial, and after a tedious proces, in which the farce of exorcising the possessed was several times repeated, and the judge's partiality and tyranny displayed in the most glaring light, upon the deposition of Altabruth, a devil of the order of Seraphim, and the chief of the possessing demons, and upon the deposition of the nuns, who pretended to be possessed of devils, the commissioners gave judgment, declaring Grandier duly attainted and convicted of the crime of magic, forcery, and possession, happening by his means in the persons of some of the Urfaline nuns, &c. for the reparation of which he was condemned to an amende honourable, and to be burnt alive with the magical characters." Grandier, innocent of the charge, heard the sentence without any emotion, and afterwards suffered the torture, ordinary and extraordinary, with unflinching fortitude, never suffering one repining exprefion against his enemies to escape him through the whole scene. The last words which he was heard to utter previously to the flames reaching his vital parts, were in supplication to God, to whose mercy he recommended himself. Such was the fate of Urban Grandier, whose pride and passions appear to have been causes of the conspiracy to which he fell a victim, and whose history exhibits a memorable example to the world. The judgment of God, the revenge of a minister, and the proclamation of a judge, may be wrought up. The relations of the case is given in "The History of the Devils of Loudun," first published at Amsterdam in 1654, and which has been frequently reprinted. As an author Grandier is known by a funeral oration for Serauella de St. Martha, which is highly commended for the masterly flakes of eloquence interpolated through it. Moreri.

GRANDINES, in Surgery, small tumours on the eyelids.

GRANDMONT, in Geography, a town of France, in the department of the Upper Vienne, near which was an abbey, suppressed in 1569; 15 miles N.E. of Limoges.

GRANDOLA, a mean town of Portugal, in the province of Evranda, containing 800 houses, situated between Caddan and the face of the sea. Behind it is the Sierra de Grandola, that proceeds in two ranges, one behind the other, from Seil to Seil; the town is 27 miles S.E. of Seil.

GRANDPRE', a town of France, in the department of the Ardennes, and chief place of a canton, in the district of Vouziers; 33 miles E. of Reims. The place contains 1350, and the canton 8617 inhabitants, on a territory of 2423 kilometres, in 14 communes.

GRANDRIEU, a town of France, in the department of the Lozere, and chief place of a canton, in the district of Mende; 10 miles N.W. of Langogne. The place contains 1657, and the canton 5880 inhabitants, on a territory of 233 kilometres, in 7 communes.

GRAND-SERRE, Le, a town of France, in the department of the Doubs, and chief place of a canton, in the district of Valencin. The place contains 1491, and the canton 6189 inhabitants, on a territory of 2324 kilometres, in 16 communes.

GRANDVILLE, or GRANVILLE, a town of France, in the department of the Chanel, and chief place of a canton, in the district of Arranches, 12 miles N.W. of it. The place contains 5454, and the canton 12,250 inhabitants, on a territory of 80 kilometres, in 8 communes. The harbour can receive only about 60 small vessels. The town is seated on a sharp rock, forming a peninsula of an oval form, and surrounded with walls; it has two gates, and two faubourgs. Near it is an oyster-fishery, and on the land side quay, and very hard stone. N. lat. 48° 50'. W. long. 1° 27'.

GRANDVILLIERS, a town of France, in the department of the Oise, and chief place of a canton, in the district of Beaulieu; 14 miles N.W. of Beauvais. The place contains 1635, and the canton 12,655 inhabitants, on a territory of 1671/2 kilometres, in 22 communes. N. lat. 49° 50'. E. long. 2° 7'.

GRANDWALDEN, or GRAN, a town of Norway, in the diocese of Christhiana; 26 miles S. of Chrisltiana. The town stands on an eminence in the midst of an extensive plain, looking down on several conical rocks, covered with firs, and remarkable for two churches in the same church-yard, called the "Two Sibers."

GRANGE, an ancient term for a barn, or place wherein to lay up and thresh corn.

The word is formed of the Latin granum; or of granum, grain, corn, &c. Hence also granger or granger, a grange-keeper or farmer.

Hence grange is a name which was formerly much applied to such farm-houses as were provided with large barns, granaries, and other similar offices, for the preservation of grain, &c.

Grange is also used, in a more extensive sense, for a whole farm, with all the appendages of fencing for horses, fields for cattle, &c. and for an inn.

Grange, Joseph de Chancel de la, in Biography, born in 1676 of an ancient French family, at Antwerp in Perigord, exhibited from his boyish days a singular passion for poetry and romance. He was educated among the Jesuits at Bourdeaux, and when he was only nine years old, he composed a comedy in three acts, which was represented by his school-fellows. His early talents seemed to have marked him out for distinction, and his mother took him to Paris, and obtained for him the place of page to the prince of Conti. Before he was sixteen, his tragedy of Jugurtha was represented in the capital, and was applauded as a most extraordinary effort of such a stripling. He continued to write pieces for the stage, which were productive of reputation and pecuniary advantages; but the work which rendered him famous, though it exposed him to much mortification and suffering, was entitled "Philippiques," a satire in verse, directed against Philip, the regent duke of Orleans. This appeared in 1748, and it charged the duke with the crime of poisoning several branches of the royal family. The
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The author attempted to escape, but, falling into the hands of his pursuers, he was committed to the prison of St Margaret. It appears that he was not brought to trial, and that he contrived to effect an escape from prison and the country, but upon the death of the regent he returned to France, where he lived unmolested. He died at his family seat at Anto-
niat in 1738. His works were collected in five vols. 12mo.
and, with his own corrections, published the year after his de-
case. They consist chiefly of tragedies, operas, and miscel-
aneous poems. The tragedies are most esteemed: they are
said to be "artful in the contexture of the plot, and abounding
in interesting situations, but feebly written, and trite in lan-
guage and sentiment." In his latter years he employed his
time on a history of Portugal. In manners he had all the
fire and vanity of a Galton: he had few friends, and
seems to have been more feared on account of his satirical
powers, than beloved for his virtues.

**GRAVE, in Geography, a town in Sweden, in the pro-
vince of Dalecarlia.** 33 miles S.S.W. of Falun.

**GRAVE, Lat. a cape on the N. coast of the island of Hi-
paniola. N. lat. 19° 55'. W. long. 72° 30'. This cape, with
Point de Dunes, forms the mouth of the bay of Monte
Chirilli, in the county of Stirling.

**GRAVING POINT, a cape on the S. coast of the Isle of Wight.
N. lat. 50° 38'. W. long. 1° 15'.

**GRAVER RIVER, a river of Upper Canada, which em-
ties itself into a bay of the same name on the N. shore of
lake Superior, W. of the Cris. This river leads to Nip-
gan, a place which formerly furnished the belt beaver
and marting, and was the farthest advanced post of the French
traders, at the time when Great Britain conquered Canada.

Cliffs and order, Syngenia Poligyna-supercilia. Nat.

Gen Ch. Common calyx imbricated, spreading; its scales
oblong, obtuse. Cor. compound; the united florets of the disk
very numerous, tubular, five-cleft, regular; females fewer,
in the circumference, tubular, three-cleft. Stam. in the united
florets, filaments five, capillary, very short; anthers united
into a cylinder, with five teeth. Pijfl. Germin small; flye-
thread-shaped, the length of the filaments; stigma undivided
in the united florets, cloven in the female ones. Peric. none,
except the permanent calyx. Seed solitary to both kinds of
florets, oblate, compressed, crowned with a toothed bor-
der. Recept hemispherical, naked.

Eff. Ch. Receptacle hemispherical, naked. Seed-crown
membranous, toothed. Calyx imbricated, spreading. Flo-
rets of the radius three-cleft.

We have alluded to this genus under ETHYLLA, from
which it differs in having a crown to the head, florets of the
radius three-cleft, and scales of the calyx obtuse. It most
approaches Tanacetum in character, but is sufficiently distinct.
The following are the only species we have been certain
of to determine.

1. G. madraapatana. (Artemisia madraapatana; Linn.
Vind v. 3. 466. 88. Abhimutha madraapatnam, fane-
ciuncis incani folio, corymbis foliaribus in ramulis fulgi-
sio speciosis; Pluk. Amalhat. t. 533. f. 3. A. minus
coloratum (Octogonum, utique brunneum fasciculata folio-
rum alis; Pluk. Alm. 2. Phys. 1. f. 2. —Leaves finit-
med, somewhat lyrate, hairy. Flower-flasks elongated —Na-
tive of the East Indies. Resut annual, tapering, branched.
Stam. procumbent, a span or more in length, full-hooded,
kev, downy. Leaves alternate, feathery, deeply pinnate,
in a lyrate form, and finnate, clothed with soft whitish
hairs, their segments rather rounded. Flowers yellow,
almoist globular, near half an inch in diameter, on axillary,
solitary, simple, hairy flanks, half as long as the leaves. Lin-
neas in both editions of Sp. Pl. quotes Pluknet, t. 377.
f. 3. Adanson, his professed critics, seems to have an-
![GRA](https://via.placeholder.com/150)

Burm. Ind. 177. t. 58. f. 3.)—Leaves wedge-shaped, blunt-
toothed, smooth. Flowers nearly fcliee.—Native of China,
and the East Indies. We received it in 1803, from the
flw of the late right honourable Charles Greville at
Paddington, where it was preferred rather for its rarity and
regularity than for beauty. It is an annual plant, much
smaller in all its parts than the foregoing, smooth, prostrate,
of a light green colour. Flower the size of a small pea,
axillary, nearly feline, whitish, sometimes with a purple
tinge. Their structure is extremely minute.

We scruple to admit Ethylka decurjata into this genus,
though somewhat similar in habit, because of its naked
seed, and sharp calyx. See ETHYLLA.

**GRANGEMOUTH, in Geography, a village of Scot-
land, of considerable extent, bounded by its Lawrence Dun-
das, upon the angle formed by the junction of the river
Caron and the canal. It defers mention as a place of
considerable trade. Vessels bring into this port timber,
 hemp, flax, deals, iron, from the Baltic, Norway, and
Sweden, and grain from foreign markets, as well as from
the coasts of England and Scotland. The trade to Lon-
don is carried on by the Caron shipping company; 3 miles
E.N.E. of Falkirk.

**GRANGERIA, in Botany, so named by Commer-
cher in memory of Mr. Granger, a surgeon, who travelled
into Egypt and Judea between the years 1730 and 1736, from
whence he sent numerous seeds to enrich the botanical
garden at Paris. He published, in 1745, in 12mo. Relation du
voyage fait en Egypte en 1730, according to Haller, who
mentions him as "not a trilling man, though he touched
but slightly upon botany. He greatly depreciates the

Gen Ch. Cal. Perianth inferior, of one leaf, bell-shaped,
with five ovate, acute, persistent segments. Cor. Petals
five, roundish, scarcely longer than the calyx, inserted into
its rim. Stam. Filaments fifteen, oval-shaped, longer than
the petals, inserted into the calyx; anthers roundish. Pijfl.
Germin superior, obovate, woody; fylle one, thread-
shaped; stigma obtuse. Peric. Drupa obtuse, somewhat
triangular. Seed. Nut triangular, of one cell.

Eff. Ch. Calyx five cleft, inferior. Petals five. Germin
woolly. Drupa with a triangular nut.

1. G. basifolia.—A tree, native of the Ile de Bourbon,
where it is called Arbre de bois, or Box tree, from the finitude of its leaves to the Bure. These are about an inch long, ovate, acute, entire, smooth and even on both sides, nearly felid, with a pair of small awl-shaped, stipular. Flowers small, in terminal or axillary clusters. Fruit somewhat like that of an olive, but smaller, and rather angular.

GRANHULT, a town of Sweden, in the province of Smaland: 35 miles N. W. of Calmar.

GRANI, in our Ancient Writers, multilaches or whiffers of a beard.

The word seems formed from the ancient Britih or Irish, greann, a beard.

It is given for a reason why the cup is refus'd to the laity, "Quia barbati, & prolixos habent granos, dum peculium inter epulis fumant, priscis laique plus insigniunt, quam oris infundunt."

GRANIFEROUS, producing or bearing any sort of grain.

GRANIFEROUS Podis, a term signifying such pods as contain small seeds of the grain kinas.

GRANITE. Under this denomination Kirwan comprehends all varieties of granite that contain more than three ingredients, such as quartz, feldspar, mica, and garnet: such supernumerary ingredients, however, must be considered as accidental, and of too little importance to confar the distinction of a particular name on the granite in which they occur.

GRANINGE, in Geography, a town of Sweden, in Angermanland, on a lake; 42 miles N. W. of Hernfand.

GRANITE, an aggregate rock, the essential ingredients of which are feldspar, quartz, and mica, being the fame as those of gneifs, from which granite differs chiefly in the arrangement of the three component parts: their being mingled without order or regularity, produces a granular fracture, while that of gneifs is generally flaky. (See Gneiss.) It is, probably, this granular nature of the rock in question which has procured it its name; though some authors are of opinion that the word granite is nothing but a corruption of granites, a name mentioned by Pliny, as that of a flower of the colour of a flory's neck. The fact is, that the word granite, which is now adopted by almost all European nations, originated with Italian antiquaries, and Tournefort was not the first writer who makes mention of it.

The three constituent parts of granite vary with regard to their colour, size, relative quantity, form, and freshness.

The colour of this rock is generally more or less reddish, because the feldspar, usually the predominating part, is oftener of that than of any other colour. Sometimes the feldspar is greyish and yellowish-white, and so like the admixed quartz, that it can be distinguished only by its peculiar fracture and lustre. It has been observed that the red colour occurs more frequently in the newer, while the greyish-white appears to be more characteristic of the older formation of granite. Also long continued exposure of granite to the action of the atmosphere contributes to render its feldspath pale or grey. Yellow and green feldspar feldspar seldom occur, as ingredients of granite. — The colour of the quartz is usually greyish; sometimes this part is perfectly colourless and transparent, in which case, as the grains cannot be viewed by transmitted light, it appears deep grey or black. — The mica is much more frequently black or grey than brown or perfectly white.

The absolute size of the ingredients of granite is subject to considerable variation; they are seen from very large to very fine granular, the latter being more frequent in the newer formation. With regard to the relative size of its constituent parts, we distinguish equally mixed from unequally mixed granite; the former being that in which the magnitude of the three ingredients is nearly the same.

The quantity of these parts is equally various: so that sometimes one, sometimes two of them predominate: upon the whole it is the feldspar that is found in the greatest proportion, and the mica in the least. There are, indeed, some varieties of granite in which the quartz or mica are entirely wanting. Such binary aggregations of the granitic kind have received distinct appellations by some authors. Thole of quartz and feldspar, or feldspar and mica, were called simple granites by Wallerius; semi-granites by Blumenbach; and Kirwan propost to denote all these duplicates in general by the name granitcul, specifying, when necessary, the constituent peculiar parts of each. The aggregate of quartz and mica is called feyseflafl, or fellafin, by some of the older German writers; and that of feldspar and mica, especially when the latter is of a brown or brownish-red colour, and forms the predominant ingredient, has obtained the Finland name of Rapakivi. Such distinctions, however, are unnecessary and inapplicable, since often in one and the same granitic mass the proportion and number of the component parts are seen considerably to vary. Besides, there are many rocks enumerated by authors as granites, which cannot, with any propriety, be referred to granite compounds; such as feldspar with hornblende, with nephritic: stone, with garnet, and granite, or the same separately combined with quartz or mica.

There is but very little variety in the form of the component parts: they are almost always massive and indeterminately angular, and seldom occur in the form of regular crystals. The feldspar is found crystallized in Bohemia, at Schakkenwalde, near Carlbad; at Tafeld, in the Saar district; also near Holwenalde, in Upper Palatinate; at Orchenkom and Keisim, in the Eichtel-gebirge; at Schneeberg, in Saxony; in England; in the island of Arran, &c. The granite in which these feldspar crystals are seen, is often of such fine grain, and the quartz and the mica are so intimately united with each other, that they form, as it were, a matrix for the crystals: such granite is called parophyritic granite. Part of the pavement on Welminister and Blackfriars' bridge consists of this species of granite. Something like crystallization of the quartz is now and then observed in granite, but it is always irregular. In the variety, called graphic or Portrey granite, in which the feldspar constitutes by far the greatest part of the mass, and which contains mica in small groups, at great distances from each other, the quartz is disposed in such a manner, that when the rock is cut in a certain direction, it exhibits forms which bear some distant resemblance to written characters: whence it has obtained its name. But by some, neither the Portrey nor Siberian graphic stones are considered true granites. Also, the mica is now and then found crystallized in granite, such as in Siberia, at Waldheim, Metweda, Jo-georgenstadt, in Bohemia, &c. In a variety of granite of Mount St. Gotthard, all the three constituent parts are said to occur crystallized together.

The feldspar is also sometimes found in the shape of cuneiform concretions, representing on their fracture a surface comparable to the paws of fome animals, or to the petals of flowers: this singular variety comes from the neighborhood of Breitenbrunn, in the Upper Ertzgebirge.

With regard to the firmness or state of preservation which these three ingredients exhibit, we have to observe that the feldspar, which, in general, has a vitreous lustre and a perfectly foliated fracture, is also seen in various stages of decomposition; it occurs dull, earthy, friable, and even entirely disintegrated, in which state it is known by the name of porcelain sand. This disintegration takes place chiefly near the surface.
face of granitic mountains, and in the immediate vicinity of veins. Granite, with feldspar thus converted into an earthly flate, is found in Cornwall, on the Hartz, at Kurkardgie-n in Saxony, &c.; and it is probable to Mr. Emmer- 

lating that the giefs-tein. (Saxm fucraniun, Limn,) which on account of its loose texture, is made use of in the brafs foun-

of Switzerland. 1. Rock crystal. 2. Beryl; in the island of Alba, and perhaps also in Siberia. 7. White common opal, sometimes occurs in the granite of Lichtenfrock in Saxony. 8. Topaze is sometimes seen, together with tin-"tone, in the granite of Zinnwald. 9. Calcaceous fpar, very feldom. 10. Fluor-fpar, the fame; in Siberia, at Geier in Zinnwald. 11. Barytes, equally feldom; in Swit-

Switzerland.

Foreign beds are fels frequently met with in granite than in other rocks. The more remarkable ones are thole of tin-"tone, galena, and blende at Zinnwald on the Bohemian frontiers; the beds of mica, particularly in Silefia and Lufatia; of quartz, and rock crystal in Switzerland. AlsO beds of feldspar are felled to occur in it. The green feldspar, called Amazon fone, is found in large mafes in the granite of the Ural mountains of Siberia.

Stratification of Granite. — Though granite occurs frequently as widely-extended mafes, in which the eye is unable to discover any continued traces of parallel separation; yet there can be no longer any doubt that thofe geologists, who abfolutely denied the exifence of stratified granite, were either entirely unacquainted with the structure of many of the European granitic mountains, or too much influenced by the principles of their favourite theories, to allow the obferved traces of demarcation to be any thing but irregular and accidental rents and furrows. Pifi even endeavours, by mathematical figures, to prove the impoffibility of stratification in granite. Notwithstanding all this, the ob-

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whole group of mountains to which it belongs; for though he raw large tabular mafses, sometimes nearly vertical, sperea-rated by fissures, they appeared to him to be much too irr-e-ular, too little extended in length and height, and v Advisory too much in thickness, to be reckoned the effects of stratifica-tion. As in the third volume of Jameson’s “System of Mineralogy,” Arran is not mentioned among the localities where stratified granite occurs, it would appear as if that geognosin does not lay any stress upon his first remark on the nature of the above-mentioned mountain.

The relative age of the different varieties of granite has engaged the attention of several writers on geology; but it must be said, that most of the opinions that have been broached on this subject, and the various ideas entertained by theorists respecting what they call regeneration of gran-ite, are too vague, or at least too little founded on actual observa-tion, to be entitled to particular notice. Some geo-logists on the other hand have absolutely denied the exist-ence of a second and third granite-formation. The Wer-nerian school admits three distinct formations of granite. The third or oldest is that which, of all rocks we are acquaint-ed with, is sunk the deepest into the interior of the earth, and which therefore may with propriety be considered as the fundamental rock. This oldest granite also constitutes the highest parts of the surface of the earth, and, thus elevated, is generally surrounded, and, as it were, enveloped by other primitive rocks. It is frequently coarse-grained and porphyrithic. It occurs both stratified and unstratified; and it is the latter which is often seen in large globular distinct concave of considerable dimensions, such as in several parts of Bohemia, in the Fichtelgebirge, in the island of Arran, &c.

This formation is, of course, far more widely extended than those of a more recent origin. The second granite formation is considered as occurring only in veins which never reach any of the newer rocks, but are confined to the oldest formation. Such granite is marked with few regularity of structure, than what is observed in the older formation; at the same time that it surpasses the newest granite, both with regard to the regularity of arrangement, and superior firmness of the constituent parts. The third, or newest granite-formation, is always found superincumbent on older primitive rocks, often in an unconfomable and over-living position: it also occurs in veins, which have been seen to inter-sect or traverse veins of the second granite formation; as a certain criterion of the greater relative age of the latter. Its structure, according to the characteristic given of it by professor Jameson, is very irregular; it has a deep red colour, and contains sometimes grains of garnet, and often fragments of various primitive rocks of various magnitude. When it occurs in veins, there are, according to the same author, not connected with any rock beyond the flints which they traverse. Examples of this newest formation are, that at Greifenstein, a large group of deep rocks between Ehrenfriedersdorf and Geyer in the Saxon metallicous mountains, where the coarse-granular and irregularly aggregated granite, composed principally of feldspar, quartz, with but a small portion of mica, occurs rolling on mica flake, in an unconformable and over-living position: it contains nobs of quartz and feldspar, as also fragments of gneiss and mica flake, from the size of a cubic inch, to that of 100 cubic feet and upwards. Another instance of this formation we have in the tin flockwork at Geyer, where it is contained in a hollow of gneiss, and agrees in its characters with that of Greifenstein. Also her portion of the same formation, is that at Johanngeorgenfladl, Auerberg, and Eichenfladl, where, however, it occurs only in veins, which are from a foot to several fathoms wide, and are usually traversed by metallic-
erous and other veins. Mr. Mohs has given a very good characteristic of this newer granite. Freckens of the first kind occur also in Bohemia, Upper Lusatia, at Missella in the Alps, in the Shetland Islands, in Glen Morion, and in the Highlands.

The nature of the full mentioned granite veins is considered in a different light by Dr. Hutton, according to whom all veins, whether they are obviously connected, or whether they have no apparent connection, with any large mafses of granite, are coeval with, and constitute a part of the main body of what is called the oldest granite by the follow-ers of the Neptunian system. Mr. Playfair has given several examples of veins involutely connected with larger mafses; in those at the site of Coll, in the Hebrides, at Portfory, in Cornwall, in Glen Tilt ; and of such as are visibly connected with the main granite body, in those occurring in the island of Arran, in Galloway, in Inverness-shire, St. Michael’s Mount, Cornwall. Mr. Jameson, however, says that he has convinced himself, after a very careful examination of the rocks of the island of Arran and of Galloway, that they do not afford a single instance of granite veins, shooting from the oldest granite into the adjacent rocks, nor of veins traversing newer primitive rocks, as it has been intimated to be the case with the granite veins in Glen Tilt. The same author observes on this occasion, that veins of feldspar have been frequently confounded with granite veins, and be judicious some observations on this subject communicated by the late Dr. Mitchell, accord-ing to which there is a most palpable difference between fup-posed and genuine granite veins; the former being frequently narrower than one inch, and commonly much ruminated, and very tortuous; but they constantly adhere more firmly to the adjacent flints, and when they contain apparent fragments, the flaty structure of these is ever conformable to that of the contiguous rock; while genuine granite veins never fall short of some inches, are generally straight, seldom giving off branches; they have a distinct separation, and contain fragments of the adjacent rock, which lie promi-nently; the granite is uniformly uniform, containing the three ingredients equally mixed; and Dr. Mitchell has always found it small-grained. The supposed granite, accord-ing to him, consists of feldspar, of a very unequal grain, including sometimes spots of mica, and rarely specks of quartz. From all which this mineralogist concludes, that the last mentioned veins are nearly of contemporaneous origin with the rocks in which they are contained, and ought, therefore, to be considered as, and called, feldspar veins.

Although granite is the hardest, and one of the most durable rocks we are acquainted with, it is, nevertheless, subject to disintegration, which manifests itself not only in the crumbling of the surface of the exposed parts of granite beds, but likewise in the separation of vein mafses, which, being di united by the enlargement of the rents and fissures that generally traverse the granite mountains, or crosses the flints in a nearly vertical direction, are partly precipitated from their high situation, partly displaced in various manners, so as to produce the appearance of huge artificial structures, and of other objects to which the fancy of the beholder may compare them.

M. De Luce has been on the Riehenbirge, in Sileia, a number of pillars produced by such disintegration, both solitary and grouped together, in a straight line, and, at a distance, presenting the appearance of many high piles of girds.

The Adon-shola mountains in Dauria, which consist of granite, are, according to Pallas, in many parts broken into all manner of shapes, representing vast ruins, grottoes, and immense flat mafses piled on one another in all directions. Several
GRANITE.

Several of the mountains are, as it were, firewreathed with blocks of granite, which, at a distance, appear as numerous herds of cattle; and it is this circumstance which is said to have procured this name of Adon-glomo, a Mongol word, denoting herd-like mountains. All these detached rocks are fragments of the vast strata of granite that compose the greatest part of the Dauric mountains. The summits of the Gastein and other mountains of Arran have the appearance of huge walls composed of large granite masses. At Huelgoet, in Lower Brittany, we are informed by Monnet, as also in the Volges, enormous masses of granite are seen piled on one another, and forming most extraordinary scenes. The granite being divided into masses by fissures, which are filled up with granite and showing less solidity, this latter is sooner acted upon by atmospheric agency, whence, by its disintegration, the masses become perfectly detached, and adopt various positions. But besides the accidental groups formed by the rolling down of the rocks, there are other groups of granitic rocks at Huelgoet, that appear to be in their natural position, and many of them form an afflament of rock masses, which have a perfectly rhomboidal form, and are regularly joined to each other by means of their corresponding planes. One of the infolded rocks in a group at Huelgoet, is called Pierre brendante, or the rocking stone: it is 21 feet long, seven feet high, and eight feet wide, and its cubical content is 1160 feet; it is so accurately poised on the edge of another rock, which serves for its base, that the strength of a few men suffices to change its centre of gravity, and to communicate an oscillatory motion to it. The phenomenon of the rocking stone is not unknown in this country; the largest is that seen at the Land's End in Cornwall, where they are called Logan-formes. It weighs upwards of fifty tons, resting on another rock of granite of consider-able height close by the sea-shore. "The two stones," says Mr. Playfair, who avails himself of this phenomenon among others to explain the migration of flint masses, "touch but in a small spot, their surfaces being considerably convex towards one another. The uppermost is so nearly in an equilibrium, that it can be made to vibrate by the strength of a man, though to oververt it entirely would require a vast force. This arises from the centre of gravity of the stone being somewhat lower than the centre of curvature of that part of it on which it has a tendency to roll; the consequence of which is, that any motion impressed on the stone forces its centre of gravity to rise, (though not very considerably) by which means it returns whenever the force is removed, and vibrate backward and forward, till it is reduced to rest. Were it required to remove the stone from its place, it might be made easily done, by cutting off a part or blowing it away by gun-powder; the stone would then lose its balance, would tumble from its pedestal, and might roll to a considerable distance. Now, what art is here required to perform, nature herself is incapable of producing. If the wind acts on one side of this great mass, shall exceed that on the opposite in more than a certain proportion, and it is not likely that that proportion will be always maintained, the equilibrium of the Logan-forme will be subverted, never to return. Thus we perceive how motion may be produced by the combined action of the decomposition and gravitation of large masses of rock."

It was probably from seeing the fantatical and imitative forms produced by granitic cliffs, and by the disintegration of granite, that Mr. Vitre framed his unfortunate hypothesis respecting the pyramids of Egypt, and the ruins of Peripolis, Palmyra, and Balbec, all which, together with the temple of Jupiter at Girgentan, the palaces of the luecas in Peru, &c. &c. were considered by that antiquary as productions of nature.

Granite is much less metallic than gneiss, and other primitive mountains; but tin and iron abound in it. Besides these, several other metals occur in it in small proportions, viz. gold, though very rarely, in Peru; native silver, almost equally common, at Wittichen and Alt Wolfisch, in the Black Forest, near veins of silver and cobalt; copper; galena, for instance, at Schreberhausen, at the foot of the Schneekuppe, in Sildia; lithnium, zinc, cobalt, manganese, molybdenum, arsenic, tungsten, and wolfram, all which occur generally in small veins; but tin, galena, and blende are found in beds at Zinnwald in Saxony, and in Bohemia.

Notwithstanding the extent of granite over the world, it may be said that scarcely any country we are acquainted with is entirely destitute of that rock. In Asia we have the Uralian and Altai mountains with the Caucasus; in Africa, the Atlas, several mountains of Egypt, thole of the Cape of Good Hope; in North America, the mountains of New York, Pennsylvania, and Virginia; in South America, great part of the Andes, the mountains de los Marches in the Carracas, the Cordilleras of Paria, Sierra Nevada de Merida, &c.; in Europe, the Szwego mountains of Scandinavia, thole of Finland, the Carpathians, the Hartz, the Riesengebirge, the mountains of Upper Luflatia, a part of the Alpine metallic mountains, (especially Eibenstock, Johanneberg, Schwartzberg, Schneeberg, Ehrenfriedersdorf, Geier, Nauenfeld, Altenberg, and Zinnwald,) the Fichtelgebirge, the Odenwald and Schwartzwald, the Alps of Switzerland and Savoy, the Apennines, Pyrenees, the mountains of Cornwall, &c. all which have granite for their principal constituent rock.

The use of granite for architectural and economical purposes is perhaps nowhere more amply displayed than at Petersburg, where not only the imperial and other palaces, but even ordinary dwelling houses, have their lower parts lined with slabs of granite. The left bank of the great Neva, from the foundery to the Gulf of Cronstadt, and both banks of the Fontanka and of the Catherine canal, are lined by high walls constructed of such slabs of granite; as are many bridges over the Neva, balustrades, &c. The pillars, stairs, balconies, &c. in the palace of Cronstadt, are almost all of the finest kinds of granite. Those employed for ornamental architecture are cut and polished by lapidaries; but those intended for less delicate purposes, such as common slabs, steps, cylinders, troughs, &c. are worked by peasants, particularly by those of Oloven. The government towns, however, Molocow not excepted, are too distant from the chief granite mountains, to be enabled to make frequent use of that rock for the above purposes.

Granite has been more particularly applied, together with granite, for the purposes of architecture and statuary, by the ancients, especially by the Egyptians; and many very interesting monuments of their skill and patience are still existing in the collections of antiquities.

M. Brand has divided the different granites used in the arts after their predominant colours; the following are the principal varieties, in which, however, the black and white kind is not included, one of its ingredients being hornblende, which affixes it a place among the felsites. See Sienite.

Grey Granite of Cheifs, in the department of the Rhone; it consisted of white quartz and black mica, with large crystals of rose-coloured feldspar. The columns of the Eglise d'Lacce.
The grey granite of Thain.—It consists of grey quartz, black mica, and white feldspar crystals, which are sometimes from two to three inches long. The quarries of this granite are on the road from Lyons to Valence, on the right bank of the Rhone. It is very well adapted for the construction of large monuments. The granite of St. Peray, not far from Thain, is exactly like this, except that its feldspar crystals are of a rose-colour.

Grey Granite of Lavozi.—Found in the small island Lavozi, near Boniface, S. of Corfia, in the frants that separate this island from Sardinia. This granite is composed chiefly of small irregular crystals of feldspar, mixed with a little black mica, besides which it contains also feldspar crystals, of a milk-white colour. In the quarry of that island a large unmixed column is to be seen, which has been relinquished by the Roman workmen.

Grey Granite of Elba.—Its grain is pretty uniform; its colour sometimes approaches to light violet. There are four columns of this variety to be seen in the Muče Napoleon; they were taken out of the church which contained the tomb of Charles-magne, at Aix-la-Chapelle.

The grey granites are much more common than the green or greenish, of which the following deserve to be mentioned.

Antique green Granite.—Its predominant ingredient is white quartz, which contains here and there some light green feldspar. There is a column of it in the Villa Panthi, near Rome.

Fine granitic antique Granite.—(Bafalte verd ordinat.) The component parts of this work are so fine and intimately blended, that they can scarcely be distinguished by the naked eye. Its colour approaches to deep olive. It is very hard, and takes a fine polish. The Egyptians have much employed it for the construction of monuments; and several statues of it may be seen in the Capitol and the Villa Albani.

There is another variety with white spots, which is known at Rome under the name of Bafalto Orientale picechio; this is very rare, for there are but two columns of it in existence, namely, in the church of St. Pudentiana at Rome. Some varieties bearing that name are ilikenite.

Granite of St. Christopher.—Composed of violet quartz, white feldspar, and green mica. This magnificent rock is found at Ofans, in the department of the Ière.

Corsican orbicular Granite.—This beautiful rock (which probably belongs to the Bentine formation) was discovered by M. Barral, in the island from which it derives its name. Its composition is very extraordinary; it has a basis of ordinary grey granite, which, however, in most parts, exhibits a considerable portion of hornblende. But what more particularly characterizes it, is a number of balls, of from one to two inches in diameter, each composed of several concentric and perfectly parallel layers, the outermost of which, generally white, opaque, and two or three lines thick, is composed of quartz and feldspar, blended in various proportions, and exhibiting a chatoyant appearance, converging towards the centre of the ball. The second layer, which is of a greenish-black colour, and about one line thick, is composed of fine laminar hornblende; and this is succeeded by a white, generally transluicid quartz layer, of about four or five lines in thickness, inclusive of two or three thin layers of hornblende, that are generally seen within the fulness of this third principal layer. Each of these layers is generally of uniform thickness in the whole of its circumference. These three parts may be considered as the coating: the interior of each ball is less defined than the surrounding layers; it consists of a blackish and a whitish substance, the former surrounded by, and passing into the latter, the centre of which is usually a dark-grey spot.

The quarry of this rock is unknown, a single block only having been found in the gulf of Valinco, in Corfia: its weight was about 80 pounds; but it was soon broke into small fragments, which are now distributed among collectors. There is a beautiful valet of it, one foot six inches high, in the cabinet of M. Dedree. The granite of Corfia is figured by M. Faugas de St. Foud, in his "Eflai de Géologie," and in Mr. Sowerby's "Exotic Mineralogy."

Among the red granites, we have what is called red oriental granite, which, as usually containing hornblende, often in large separate patches, will be described under SiENITE.

The red Granite of Liguria.—This granite, says M. Patrin, is distinguished from others in this, that the feldspar, instead of being in grains, or parallelopid crystal, as in most other granites, coarsely appears in the shape of round or oval pieces of from half an inch to two inches in diameter. This granite takes a very fine polish, and in this state exhibits the feldspar in the shape of white, round, or oval chatoyant spots, in a reddish ground. The rock, which serves as a pedestal of the equinarian statue of Peter the Great, at St. Peterburg, is of this granite: the block was originally 32 feet long, 21 feet thick, and 17 feet long; but, in order to give it its present shape, imitative of a picturesque natural rock, it has been much diminished in size. This block was disengaged from a swamp, about forty versts from Peterburg: its weight was calculated to be above three millions of pounds. We have seen several fragments that were detached from the very block forming the pedestal of the statue; but in none of them did we observe the forms ascribed by Patrin to the feldspar.

The public summer promenade-garden at Peterburg is decorated with a superb colonade of this granite: the columns, which are sixty in number, are of the Tufcan order; their shafts, made of one piece, are about twenty feet high, and three feet in diameter. The island, called Kotlin-Oilrow, on which is the fortress of Cronstadt, is covered with blocks of this granite, the feldspar of which is sometimes of the kind called Labrador-iron.

Red Granite of the Voges Mountains.—This granite is composed of large laminé of rose-coloured feldspar, grey grains of quartz, and small scales of mica. It has fo strong a resemblance to the Egyptian red granite, that it is difficult to distinguish them. Its quarries are on the heights of Montaunier, near the Papean mountains, in the Voges.

Violet Granite of Elba.—The feldspar of this variety is in large violet crystals. The pedestal of the equinarian statue, in the Piazza della Santissima Annunziata at Florence, is made of it, as are also the fodes in the church of St. Lawrence in the same town.

Rose-coloured Granite of Bareno.—This beautiful granite consists of fine-coloured feldspar, white quartz, and some grains of black mica. Considerable quarries of it are found on the borders of the Lago Maggiore, which are worked, without intermission, for supplying Mian, and the whole of the neighbourling country, with this granite. It takes a very fine polish, and on it exhibits ribbands, or zones, of a grey colour, which are composed of the same ingredients as the rest of the mass, but reduced into very minute particles. Many columns, porticos, &c. are seen of it at Milan.

The name of graphic granite is given to those kinds in which the feldspar forms large cretations, intermixed with grey quartz-crystals, exhibiting, when cut transversely, axi-
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granular figures, mostly shaped like a 7; while others are less regular, and bear a dimly resemblance to rude alphabetical writing. They are not considered to be genuine granite by some mineralogists.

Graphie Granite of Porphyry.—The fieldspar is of various tints of pale flesh-red; the quartz dark, but transparent, with now and then some small particles of mica. This rock is minutely described by Dr. Hutton.

Graphite Granite of Siberia.—Its fieldspar is of a yellowish-white, or reddish colour; the quartz, exhibiting figures similar to those of the quartz in the preceding foid, is of the variety called fimoaxy topaze. Mica occurs in it in small nebs, and black horn in acicular crystals.

Graphite Granite of Austria.—Of a pale rofe-colour; quartz crystals grey, very numerous. It is found in the neighbourhood of Austria, in the department of Saline-et-Loire, particularly at Marmagne. This, in M. Brand's opinion, is the most beautiful of all graphic granites. Another variety of this stone is found at the same place; its fieldspar is white; the quartz grey, in small crystals; it is susceptible of very fine polish.

Graphite Granite of Conflant.—Like-wise of a rofe-colour; but generally paler than that of Austria, from which it is also distinguishable, by its quartz-crystals being larger, and at greater distance from each other. It contains some faintly disseminated bronze-coloured mica. It takes a fine polish.

GRANVOROUS, an epithet or denomination given to fuch animals as feed upon corn, or any other grain or seeds.

Granivorous animals are chiefly of the bird kind. These have a peculiar provision for the digging of fo dry and hard a food.

GRANNA, in Geography, a town in Sweden, in the province of Smalnad; 18 miles N.E. of Jonköping.

GRANO, in Geography, a performer on the trumpet and German flute, and a composer of tunes for those instruments, which had their origin in the early part of the last century. He was a kind of mungrel dilettante, who during many years condescended to make concerts and give lessons, en professeur, always infinuating that it was merely for the pleasure of amusing the public and instructing individuals. Crano's trumpet march was long used by the Guards.

GRANON, in Geography, a small island on the W. side of the gulf of Bothnia. "N. lat. 61° 5'. E. long. 17° 5'.

GRANSEE, a town of the Middle Mark of Brandenburg; 30 miles N. N.W. of Berlin. N. lat. 52° 59'. E. long. 13° 13'.

GRANSO, an island in the Baltic, near the E. coast of Sweden. N. lat. 57° 45'. E. long. 16° 5'.

GRANSON, a town of Switzerland, in a bailliage of the same name, belonging to Bern and Friburg, situated between the lake of Neuchatel and mount Jura, and remarkable for the battle in which Charles the Bold, Duke of Burgundy, was defeated by the Swiss in 1476; 16 miles S. W. of Neuchatel. N. lat. 46° 50'. E. long. 6° 26'.

GRANT, Coxsoto, in Lasso, the regular method by the crown of transferring the property of incorporeal hereditaments, or such things of which no livery can be had. (Co. Litt. 9.) For which reason all corporeal hereditaments, as lands and houses, are said to lie in livery; and the others, as advowsons, commons, rents, revenues, &c., to lie in grant. (Ibid. 172.)

The reason is thus given by Bracton (I. ii. c. 18.): "traditio, or livery, nihil aliud est quam rei corporalis de personas in personas, de manu in manum, translatio aut in possessum induit; sed rei incorporeae, que sunt ipsum jus rei vel corporis invenietur, traditione non patiuntur." There, therefore, pass merely by the delivery of the deed. And in signories, or reversion of lands, such grant, together with the attornment of the tenant, (while attornments were requisite,) were held to be of equal notoriety with, and therefore equivalent to, a feoffment and livery of lands in immediate possession. It therefore differs but little from a feoffment, except in its subject-matter; for the operative words therein commonly used are "deeti et cuiue," "have given and granted." For the difference between gifts and grants, see the article GIFT. The king's grants are matter of public record. (See RECORD.) No freehold can be given to the king, nor derived from him, but by matter of record. To this end a variety of offices are erected, conferring in a regular subordination one with another, through which all the king's grants must pass, and be transcribed, and enrolled. That the same may be narrowly inspected by his officers, who will inform you any thing contained therein is improper, or unlawful to be pleaded. These grants, whether of lands, honours, liberties, franchises, orught besides, are contained in charters, or letters patent. (See PATENTS.) The manner of granting by the king does no more differ from that by a subject, than the constitution of his grants when made. 1. A grant made by the king, "at the suit of the grantees," shall be taken most beneficially for the king, and against the party; whereas the grant of a subject is confided most strongly against the grantor. It is therefore usual to infer in the king's grants, that they are made, not at the suit of the grantee, but "ex speciali gratia, certa scientia, et mero motu regis," and then they have a more liberal construction. 2. A subject's grant shall be construed to include many things, besides what are expressly, if necessary, for the operation of the grant. Thus, in a private grant of the profits of land for one year, free ingests, egrets, and regrets, to cut and carry away those profits are also inclusively granted. (Co. Litt. 55.) And if a feoffment of land was made by a lord to his vassal, this operated as a manumission (Litt. 565,) for he was otherwise unable to hold it. But the king's grant shall not extend to any other intent, than that which is precisely expressed in the grant. As, if he grants land to an alien, it operates nothing, for such grant shall not also enure to make him a denizen, that he may be capable of taking by grant. (Bro. Abr. tit. patent. 62. Finch. L. 110.) 3. When it appears, from the face of the grant, that the king is mistaken, or deceived, either in matter of fact or matter of law, as in case of false suggestion, misinformation, or misdirection of former grants; or if his own title to the thing granted be different from what he supposes; or if the grant be informal; or if he grants an esate contrary to the rules of law; in any of these cases the grant is absolutely void. (Frem 172. Finch. 101, 462.) To prevent deceits of the king, with regard to the value of the esate granted, it is particularly provided by the statute 1 Hen. IV. c. 6. that no grant of his shall be good, unless, in the grantees petition for them, profits annexed be made of the real value of the lands. Blacks. Com. vol. i. 261. 368.

GRANTHAM, in Geography, a township of Upper Canada, in the county of Lincoln, fronting lake Ontario.

GRANTHAM, a market and borough town in the foke, or wapentake, of the same name, in Kelleven division of the county of Lincoln, England, is situated on the side of the river Witham, on the ancient Roman road called Ermine street. The town comprises four principal streets. The church is an elegant stone structure, consisting of a nave and two spacious aisles, with large handsome pointed windows, and is celebrated for its lofty spire, which is 275 feet in height. The style of architecture appears to be that of the thirteenth century; though Mr. Gough observes that the church was endowed by Hugh, bishop of Lincoln, A.D. 1100.
Beneath the church is a chancel-house, filled with human skulls and other bones. Among several handiwork monuments in this edifice are, one to Sir Thomas Bury, chief baron there of exchequer in the time of George I, and one to Sir Dudley Ryder, chief justice of the King's Bench in the succeeding reign. The font exhibits a fine specimen of ancient sculpture.

Granville was incorporated under a charter granted by Edward IV, in 1463; when it first returned members to parliament; the representatives are chosen by the freemen of the borough. The civil government is vested in an alderman, a recorder, 12 common burgesses, a coroner, an echeator, and twelve second men, who are the common council. The jurisdiction of this corporation extends over the whole foke, comprehending twelve villages, and the alderman acts as sheriff of the town and foke, the sheriff of the county having no authority within the foke and district thereof. The guildhall was rebuilt under an act of parliament in 1787. A free-school was founded here by Richard Fox, bishop of Winchester, and further endowed by King Edward VI; this school attracts attention, from the circumstance of its having been a place of education to that luminary of science, Sir Isaac Newton. Near the south entrance of the church, on St. Peter's Hill, formerly stood an elegant cross, erected by King Edward I, in memory of Eleanor his queen, who died in 1290; this being one of the places where the corpse was laid in state in its way for interment in Westminster Abbey. Granville is distant from London 111 miles N., has a well supplied market on Saturdays, and five annual fairs. In the return under the late population act, the number of houses was 631, occupied by 3303 inhabitants.

A canal has been lately cut from Grantham to the river Trent, an extent of 25 miles. It is supplied with water by means of large reservoirs made for that purpose. The chief articles conveyed by this navigation are corn and coals. Turner's History of the Soke of Grantham, &c. Beauties of England and Wales, vol. 15.

Grantham Canal, is the parliamentary name of an inland navigation about 33 miles long, in the counties of Nottingham, Leicester, and Lincoln, of which we gave an account in our article Caxton, and nothing material has occurred to be added thereto.

Grantown, a town of Scotland, in the county of Inverness; 17 miles S. of Fores.

Granville, George, baron Landdown, in Biography, a nobleman chiefly remembered as a poet, born in 1667, was son of Barnard Greenville, one of the distinguished family of Greenville or Granville, the latter mode of spelling the name being introduced by the subj ect of this article, who is thereby separated from the rest of his house. He shewed very early talents, and was entered, in his twelfth year, at Trinity college, Cambridge. In the same year, he wrote a copy of verses on the duchess of York's visit to the university, and on the accostment of James II, he offered incense to the new prince in three short pieces, of which Dr. Johnson says, "the first is profane, and the two others such as a boy might be expected to produce." In 1688, when an invasion was threatened, he was desirous of devoting his life to the service of James, and requested his father to present him to the king for that purpose. The revolution succeeded, and being put on neither interest nor considerable fortune, he lived in literary retirement. During this period his dramatic works were chiefly composed and acted. The first of these was "The Gallants," said by himself, by way of apology, to have been written at an age when foolish are but beginning to spell. This was afterwards brought forward in a more correct form, under the title of "Once a Lover and always a Lover." His tragedy of "Heroic Love," founded on the fable of Homer's Iliad, was acted the same year with great applause from the wits and critics. On this occasion he was complimented in a copy of verses from the pen of Dryden. When queen Anne came to the crown, Mr. Granville emerged from the political obscurity in which he had lived: his fortune was increased by the death of his father, and that of his uncle, who left him an annuity. He was now elected a member of parliament for the borough of Fowey, and feeling the common ardour of his countrymen of all parties against the ambition of Lewis XIV., he joined other literary persons in a translation of the Philippics of Demosthenes, to oppose the nation to oppose the Philip of modern times. By the death of his elder brother Sir Devil Granville, in 1726, he succeeded to a good estate, and he continued to serve in parliament, sitting as knight of the shire for the county of Cornwall. On the change of administration in 1716, he was appointed secretary of war in the room of Sir Robert Walpole. He married in the same year Mary, the daughter of the earl of Jersey, then widow of Thomas Thynne, esq. Shortly after this he was introduced into the house of peers by the style and title of lord Landdown, baron of Biddeford, at the memorable creation of twelve peers, in one day, viz. December 31, 1711. The elevation, however, of lord Landdown was not one of those which appeared very extraordinary, as two peerages had become extinct in the Granville family. On account of his principles and conduct he stood high in favour of the queen, who made him a privy councillor, comptroller and treasurer of the household; but the accesion of George I put an end to the power of his party, and deprived him of his place. He remained steady to his former connections, protééting against measures which he deemed unconstitutional, and in consequence of his zeal he was regarded with a suspicious eye, and was reckoned by people in power as a disaffected man. Upon the breaking out of the rebellion in 1715, he was committed to the Tower, and kept confined in that fortress till February 1717, when he obtained his liberty and returned his seat in the house of lords. In 1719 he opposed with violence the proposed repeal of the bill to prevent occasional conformity; his speech on the subject he afterwards printed. Subsequently to this a derangement in his private affairs, owing to the want of economy, obliged him to spend some years on the continent. During his absence, the first volume of bishop Burnet's "History of his own Times," making its appearance, lord Landdown undertook the vindication of the duke of Albemarle and the earl of Bath, from some affronts thrown upon them in that work. He also took occasion to vindicate his great uncle, sir Richard Greenville, from the unfavourable representations of his conduct by lord Clarendon, and archdeacon Echard. On this occasion he published two tracts in 1732. In the same year he published a splendid edition of his works, leaving out a comedy, which, on account of its licentiousness, had been objected to, and he also omitted to insert his speech against occasional conformity. He now felt reconciled to the measures of government, and eloquent in prose and verse, he engaged in the futile and regard with horror. He went to court, and was graciously received by queen Caroline, to whom he presented his works, with some elegant lines written in a blank leaf. He died Jan. 30, 1735, in his 64th year. In private life, lord Landdown was amiable, polite, and candid. He was liberal in patronizing literary merit, and had the credit of being one of the first to recognize the rising powers of Pope, who repaid him for his kindness by his dedication of Windsor Forest.
Forst. His own talents, as a poet, were not of the first order, but his works are still read with pleasure. He is chiefly known as a writer of amatory pieces, most of which are addressed to Myra, the countess of Newburgh, the object of his youthful passion. These are not either highly poetical nor strongly expressive of feeling. Johnson characterizes his "Essay on natural Flights in Poetry," as professing didactic merit, and his "British Enchanters," as lively and pleasing. He seems to think favourably like- 


Granville, in Geography. See Granville.

Granville, a county of North Carolina, in Hillsborough district, S. of Virginia, containing 14,015 inhabitants, of whom 6106 are slaves. Its chief town is Williamsburg.

—Alfo, a township of the county of Annapolis, in Nova Scotia, N. of Annapolis river, on the bay of Fundy, 30 miles long; first settled from New England.—Alfo, a town-

ship of Hampshiire county, Massachusetts, about 14 miles W. of Springfield, incorporated in 1754, and containing 2300 inhabitants.—Alfo, a post-town in Washington county, New York, containing 3157 inhabitants.

Granville, or Greenville, a flourishing town in Muck-

lenburg county, Kentucky.

Granville's River, a river of the island of Egmont, or New Guernsey, which runs into the sea, S. lat. 1o° 42'.

E. long. 163° 58'.

Granulated Oil. See Oil.

Granulation, in Chemistry, an operation performed on metals, whereby they are reduced into small grains or globules.

It is done by melting them, and when in fusion, calling them from a certain height into cold water; in which they congeal into granules, as required, and are hereby rendered more easily to be diffused. The belt way is to pour the fluid metal through a cullender, or a new birchen bream, or to agitate the water with a bream, thus giving it a circular motion while the metal is poured in. Copper is granulated for making brats in a cylindrical wooden reevoir, four or five feet deep, in which a circular brat or copper bottom may be raised or lowered by means of a chain: The reevoir is covered with a copper lid, in the middle of which is a hole half a foot in diameter, intended to receive an iron ladle pierced with holes and coated with clay. The reevoir being filled with water, the melted copper is poured through the holes in the ladle into the water; where it is broken by its fall into smaller drops or grains, rendered solid by the cold water, and collected in the moveable bottom, which is raised by the annexed chain, that the granulated copper may be taken out. Macquer, Dict. Chem. Eng. edit. art Broil. See Brass.

Lead, tin, and brats, which are very brittle, when they are so hot as to be almost fused, may be granulated by pouring them, in a flate of fusion, into a box, the inner surface of which is rubbed with powdered chalk, and by shaking the box: the metals in the box are no sooner become solid, and consequently very brittle, than they are flivered, by being dashed against the sides of the vesel into a fine dust. Silver and gold, and the more tenacious metals, must be granulated in either of the first methods above-mentioned, with water. Cramer, Art of All, p. 79.

The term granulation is also applied to gun-powder: which fee.

The granulation of common boiling shot consists merely in causing the fused metal to fall in equal spherical drops into water. The lead is melted with the addition of a small proportion of arsenic, which being reduced to a metallic state, by means of grease floured in during the fusion, renders it less fluid. An oblong shallow vessel of iron, perhaps 10 inches wide, 14 long, and 2 deep, called a "Card," whose bottom is pierced with holes, proportionate to the size of the shot, is placed at the height of from one to three inches, over the surface of a tub of water, covered with a thin film of oil. The card is previously heated to the temperature of the metal, by immerging it in the caudron; and a quantity of soft drops or scoriæ, found on the surface of the fused alloy, is then placed on its perforated bottom, and being slightly prefled down with the ladle, forms a kind of filter, which partly chokes up the apertures, and prevents the metal from flowing through them in continuous streams. The fusled metal is then poured by ladle-fills into this vesel, and appears, notwithstanding, to run through it with considerable velocity; so that it seems difficult to believe, that it falls in separate drops, till one is convinced by taking up a quantity of shot from the bottom of the water. The imperfections to which this shot is subject, are remedied in the patent shot, the manufacture of which differs from that of the preceding kind, in the addition of a larger portion of arsenic, which varies according to the quantity of the lead, in dropping it from such a height, that it becomes solid before it enters the water, which is from 10 to 1500 feet. Besides, it is first dried and sifted. It is then boarded, which consists in fanning it on several polished slabs, or trays of hard wood, with rims in the form of a P, except that the sides converge towards the lower part, to which a slight inclination and alternate motion in their own planes are given by boys employed in the manufacture. The shot, whose form is imperfect, are detected by the fluggage of their motion, and remain behind, whilst the others roll off from the board. The last operation is the polishing; which is performed by agitating the shot with the addition of a very small quantity of black-lead, not exceeding two spoonfuls to a ton, in an iron vesel, turning on an horizontal axis, like a barrel churn. It does not appear that any higher degree of perfection than that which is thus attained remains to be desired. The argentum brilliany of the shot when newly made, the beautiful accuracy of its form, and the curious indiume of inanimate tastes which it preents when feattered on a plate, renders it even an agreeable object of contemplation. Nicholsoo's Journal, vol. 1. 406.

Granulation. In Surgery, granulations are the small eminences of new animal matter, with which the cavities of fores and wounds become filled up in the process of healing. Granulations, according to Mr. Hunter, are formed by an exudation of the coagulating lymph from the vesels, into which new substance the old vesels very probably extemate the same time that entirely new ones are generated in it. Hence granulations are exceedingly vateral, perhaps more than almost any other animal substance. Mr. Hunter informs us, that he noticed upon a fore a white substance, exactly similar in every visible respect to coagulating lymph. He did not attempt to wipe it off, and the next day of dressing he found this very substance vateral; for, on touching it with a probe, it bledd freely. He observed the same appearance on the surface of a bone that had been laid bare. He once scraped off some of the outside of one of the bones of the foot, in order to see if the surface would granulate. The following day he remarked, that the scraped part was covered with a whitish substance, having a tinge of blue. When he paffed his probe into it, he did not feel the bone bare; but only its resistancy. He conceived this substance was coagulating lymph, thrown out in consequence of in-
granulation, and that it would be forced off when suppuration came on; but on the succeeding day he found it vascular, having all the appearance of healthy granulations.

The vessels of granulations first pass to their basis from the original parts, whatever these may be, and then run in nearly parallel lines to their external surface, where they seem as if they ended.

The surface of the new fulbustace continues to have the same disposition for the secretion of pus, as the parts from which it itself was produced. Granulations are very convex, which is an appearance the very reverse of what happens in ulceration, or while a fur is increasing in size. They appear rough, in consequence of having a great many points or small eminences, and they are deemed the more healthy, the smaller such points are.

Healthy granulations are of a deep florid red colour, a circumstance which might lead one to suspect, that the colour was principally owing to the arterial blood; but Mr. Hunter was of opinion, that this appearance only denoted a brisk circulation in the new-formed fulbustace, the blood not having time to become dark.

When granulations are naturally of a livid red, they are commonly unhealthy, and have a languid circulation. Such appearances may often be induced by position, and we frequently see it take place on those of the leg, when the limb is not kept in a horizontal posture. In this circumstance, the new-formed vessels are incapable of supporting the increased column of blood, and of acting upon it. The flagrant allows the change of colour to happen, and the alteration, in all probability, takes place both in the arteries and veins. Here may be seen the reason why fore legs are frequently very backward in healing, when the patient is suffered to put his foot on the ground, or to walk about.

Healthy granulations, situated on an exposed or flat surface, rise nearly even with the surface of the surrounding skin, and often a little higher; and in this state they are always of a florid red colour. When they exceed this height, and assume a growing disposition, they are then unhealthy, and they become soft and spongy, without any disposition to form skin.

Granulations always have the same disposition as the parts upon which they are formed; and take on the same mode of action. If it is a diseased part, they are diseased; and if the disease be of any specific kind, they are also of the same nature, and, of course, produce matter of the same quality.

When granulations are healthy, they are always prone to unite with each other, the great force of which is to bring about the union of parts, somewhat like what is the result of union by the first intention. See WORXS.

The disposition which granulations have to unite with each other upon coming into contact, without the appearance of any intermediate animal substance, is perhaps effected, as Mr. Hunter conjectures, in the following manner. When two sound granulations approach together, the mouths of the secreting vessels of the one coming to oppose the mouths of similar vessels of the other, they are stimulated into action, which is mutual; so that a kind of sympathetic attraction takes place, and as they are solids, the attraction of cohesion is established between them. This has been termed inoculation. The vessels thus joined are altered from secreting to circulating. There are some other furnishes hazarded by Mr. Hunter respecting the rational of this minute process of nature; but the curious reader must refer for them to the author's own relation of the subject.

Mr. Hunter informs us, that he has seen two granulations on the head, viz. one from the dura mater after trepanning, and the other from the scalp, unite over the bare one, which was between them, so strongly in twenty-four hours, that some force was required to separate them, and when separated, they bled.

The inner surface of the skin, in cases of ulcers, not only does not readily granulate, but does not readily unite with the granulations underneath. Hence the frequent formation of fistulas and sinuses.

Unhealthy granulations have not an equal tendency to unite with each other; a smooth surface is formed, which continues to secrete matter. Thus, Mr. Hunter regarded the internal surface of a fistulous ulcer as, in some degree, similar to the inner surface of the urethra, when it is forming the discharge commonly called a gleet. Such fures have no disposition in their granulations to unite, and nothing can produce an union between them, but altering the disposition of these granulations, by exciting a considerable inflammatory and probably ulceration; so as to form new granulations, and by this means give them a chance of falling into a sound state.

It is also noticed by Mr. Hunter, that granulations are not furnished with so much power as parts puffed, which are originally formed. Hence they more readily ulcerate and slough. He states, that they not only draw the condition of the part in which they grow, or the condition in which they are themselves, but also, how the constitution is affected by many diseases.

The same author has made some observations respecting the longevity of granulations. He says, that they often seem to be formed with only dated periods of life, and those much shorter, than the life of the part, on which such granulations are situated. Their life, indeed, does not appear to be so short, when cicatization can be accomplished; but while a fur is in a granulating state, they frequently persist without any visible cause. Thus, says Mr. Hunter, a person may have on his leg a fur, which granulates well, the granulations have a healthy appearance, the skin is forming round the edges, and every thing promises well, when, all at once, the granulations become livid, lose their life, and immediately slough off. In some instances, they are destroyed, partly by ulceration, and partly by mortification. Then new granulations are frequently produced, and go through similar changes. Sometimes this happens three or four times in the same person. Mr. Hunter in vain tried various methods for rendering the granulations in such cases more durable.

Suppuration and granulation are essential for the cicatization and union of almost every wound, which has not been united by the first intention; a few small wounds and scratches, which heal under a scab, being the only exceptions.

Our author, in the following section of his treatise on the blood, notices, that cicatization seems to be in view immediately after the granulations are formed. The parts which had receded, in consequence of a breach being made in them, by their natural elasticity, and, probably, by muscular contraction, now begin to be brought together by this new fulbustace, which soon contracts. The contraction takes place in every joint, but principally from edge to edge, which brings the circumference of the fore towards the centre, so that the fore becomes smaller and smaller, although little or no new skin may be formed.

The tendency in the granulations to contract is, in some degree, proportioned to the general healing disposition of the fore, and the loofness of the parts, on which they are formed. When new skin cannot be produced, the granulations
do not fo readily contrast, and, therefore, Mr. Hunter infers, that their contraction and the production of skin are probably effects of one cause. The induration, occasioned by inflammation, retards the contraction of granulations, though Mr. Hunter was inclined to think, that the circumstance did not arise so much from a mechanical principle, as from the diminution of the disposition to the process occasioned by the inflammation itself. Granulations, however, as the same writer explains, are sometimes undoubtedly retarded in their contraction by mechanical causes, when formed on parts naturally fixed, such as a bone; for instance, on the skull, the femur, &c.

When, by reason of a loss of substance, there is a deep hollow fore, and the contraction of the granulations is considerably advanced, before they have had time to rise as high as the skin, the edges of the latter part are generally drawn down, and tucked in by it, in the direction of the excavated surface of the fore.

If it is a cavity or abscess, which is granulating, with only a small opening, as often happens when the surgeon has neglected to make a free aperture, the whole circumference contracts, like the bladder of urine, till little or no cavity remains; and if any cavity is left, when the granulations can contract no further, they unite with such as are opposite to them.

This contraction in the granulations, says Mr. Hunter, is continued till the whole of a fore is healed, or skinned over; but it happens in the greatest degree in the beginning, when there is least resilience in the surrounding parts.

The contraction of granulations may often be afflicted by art, namely, by using bandages, which tend to pull, draw, or keep the skin near to the fore which is healing.

Besides the contractile power of the granulations, there is a similar power in the surrounding edge of the cicatrizing skin, which affords the contraction of the granulations, and is even more considerable, drawing the mouth of the wound together like a purse, and sometimes, when the surface of the fore is high, grading the granulations.

The contractile power of the skin is chiefly confined to the very edge, where it is healing. The surrounding old skin either does not contract at all, or not much, as is evident from its being thrown into folds and plaits, while the new skin is smooth and shining. The original skin, having little or no power of contraction, is a reason why round fores cannot to readily heal as long ones.

Mr. Hunter has explained, that the uses, arising from the contraction of granulations, are various. It facilitates the healing of a fore, as there are two operations going on at the same time, viz. contraction and skinning. It avoids the formation of much new skin, an effect which is very evident in all fores which are healed, especially in found parts. When a thick thigh, seven or eight inches in diameter, has been amputated, the surface of the fore is of the same width; yet, in the end, the cicatrix will be no broader than a crow's-foot, in consequence of the old skin becoming drawn over, by the contractile power of the granulations. The advantage of this is considerable, since such parts as are originally formed are always much fitter for the purposes of life than those which are newly formed.

After all, a fore is covered with skin, the substance, which is the remains of the granulations on which the new skin is formed, till it continues to contract, till hardly any thing more is left than what the new skin stands upon. This is a very small part, in comparison with the first formed granulations, and, in time, it loses most of its apparent vessels, becoming white and limonaceous. All new-healed fores are at first redder than the common skin, but afterwards become much whiter.

As the granulations contract, the surrounding old skin is stretched to cover the part which is deprived of integuments. At first, the skin is brought little further than into the portion from which it had receded, on the occurrence of the wound; but afterwards it becomes drawn much more considerably, being stretched and elongated. See Hunter's Treatise on the Blood, Inflammation, &c. chap. 7.

GRANULES, in Geology, is a term which Mr. Whitehurst, ("Enquiry," 1st edit. p. 180) and others, employ to express the grains or minute lumps of flinty matter, composing the sand usually found on the surface of valleys, and which is formed by attrition and the grinding down of stones of different kinds.

GRANULOS. Roots, are those composed of smaller knobs than the grumose ones, and resembling so many grains of corn; of this sort is the white saxifrage.

GRANUM VIVIS, in Botany, a name given by some authors to the turpentine-tree. The fruit of this tree is reddish while unripe; but as it ripens, it becomes of a deep blueish-green colour, and hence the name.

GRANZA, in Geography, a town of Africa, in the country of Magadona.

GRANZOW, a town of the Ucker-Mark of Brandenburg; 8 miles S. E. of Prenzlow.

GRAO, a port of Spain, in Valencia, which carries on a coasting trade along the Mediterranean; on one side, on the coast of Catalonia, Roussillon, Languedoc, as far as Marselles; and on the other side, to Alicante, Cartagena, and Malaga; some vessels even pass the straits of Gibraltar, into the Atlantic, and go to Cadiz; and sometimes they go round Portugal as far as the ports of Galicia. The largest of these ships are from 50 to 60 tons, each having a crew not exceeding 11 men. They carry out wines, silk, wool, dry fruits, and kail; and return with linens, woollens, ironmongery, spices, and corn. Grao is pleasant in summer, on account of the feath-baths, which draw together a great number of people for health or amusement.

GRAPE, the fruit of the vine. See Vine and Wine. See also CURRANTS and Raisins.

GRAPE Hyacinth. See Hyacinth.

GRAPE, Muscros or sea-fade. See Coccus Lata.

GRAPE Wolf. See Lycozystyle.

GRAPES, gall, in Natural History, a name given by authors to a species of protuberances, resembling clusters of grapes, and when ripe of a reddish colour, which are found hanging from the oak at some seasons of the year. These are genuine galls, though of a peculiar kind, and owe their origin to a very small four-winged black fly. See Galls.

GRAPF-fruit, in Artificial, is a combination of small flat, put into a thick canvas bag, and corded strongly together, so as to form a kind of cylinder, whose diameter is equal to that of the ball adapted to the cannon. The number of shot in grape varies according to the service or size of the guns; in sea-service nine is always the number; but by land it is increased to any number or size, from one ounce and a quarter to weight to three or four pounds. In sea-service, the bottoms and pins are made of iron, whereas those used by land are of wood.

GRAPF-fruit, Botrites, is a sort of flagellates, which effervesc with acids, according to Dr. Grew, "Rarities of Gresham College," p. 304. It is also the name of certain botroidal flagellites, which are sometimes met with, pendant from the roofs of caverns in lime-flour districts.

GRAPEs, in the Muses, a term used to signify the arrows or many tumours that happen in a horse's legs. See Armbes. GRA-
GRAPHICA PERSPECTIVE, in Optics, is an instrument described by Mr. Martin, consisting of a tube containing two convex lenses, which are placed at twice their focal distance from each other; and in their common focus is another glass divided into equal parts with the point of a diamond. Though this instrument does not magnify any object, yet the angle under which an object is seen is easily known by it; and since this angle varies with the distance of objects, it is easily applied to the purpose of measuring inaccessible heights and distances; and since the field of view is divided into equal figures, it is useful in drawing the perspective appearance of objects. Moreover, as all foreign light is excluded by the tube in which these lenses are inclosed, pictures seen through it have a fine rehevo, on which account, and also because objects appear inverted through it, the images of a camera obscura are viewed with it to peculiar advantage. If a lens of a greater focal length be fixed at a proper distance from the centre of the tube, this instrument will be a telescope, and will magnify the prints which are looked at through it; and if a small lens be used, it will be a microscope, and the same micrometer will serve for them both. Martin’s Optics, chap. xvii. p. 260, &c.

GRAPHIDA, in Natural History, a name by which some authors have called the morchus, or French chalk.

GRAPHIS, in Botany, from γραφή, a name invented by Adamson, is pleased to label it grafe, and adopted by Ehrhart, for the various species comprehended under the Lichen scriptus of Linnaeus, and which constitute the very distinct genus of Ogeaphis in Acharus; see Eng. Bot. v. 25, 26 t. 1753, &c.

GRAPHICUS, in the Writings of the Ancients, a name given to an instrument used for extracting darts from wounds. It is said to have been the invention of Diocles, and is described by Cellus.

GRAPHITE. See Plumbago.

GRAPHOIDES, γραφίδοι, in Anatomy, an appendage of the bones of the temples, long, small, sharp, and a little crooked, like a cock’s spur; called also a syphoid.

The fame name is sometimes applied to the mucus of gratia.

Likewise an extension of the brain, resembling a writing pen.

GRAPHOMETER, a name which some authors, particularly the French, give to a surveying instrument, by us commonly called a semicircule; which see. Mr. Nicholson, in the fifth volume of his ‘Journal,’ 8vo. has described, and illustrated by appropriate figures, a subterranean graphometer, invented by M. Komarzowski, F. R. S., and presented to the National Institute of France. It is a simple construction of the common theodolite (which see), and is calculated to answer the author’s intentions in operations like those of mining, where great accuracy is not required. In vol. i. of the name ‘Journal,’ we have the description of an instrument resembling a graphometer, invented by C. Carangeot, for determining the mutual inclination of the faces of a crystal, or its prominent angles; it consists of two concentric, equal quadrants joined by a hinge; to which are applied compass-legs or radii, capable of being shortened to apply to small crystals, &c. See Graphometer. See also Plate VI. Crystallography, p. 95.

GRAPHNEL, or GRAPLING, or Ship-board, a kind of small anchor for boats or galleys to ride by. It differs from other anchors, as having four or five flukes and no flack, though there are some with three flukes, with which they use to sweep for lavers or small cables. In men of war also, the grapnels, or at least a lighter kind of them, whose flukes are furnished with strong bars on their points, are used to be thrown into an enemy’s ship, in order to catch hold of some of her gratings, rails, gun-wales, &c. This is done in order to board of her. They are particularly useful in fire-ships, and called fire-grapplings.

GRAAPPLE, in the Mercantile, a horse is said to grasp with one or both legs, when he catches or raves them more hastily and higher than ordinary, as if he were curvetting.

GRAPTOLITHI, in Natural History, are the petrificata fides of Limnaeus and others; as dendricus, landscape-marble, dendropotamites, &c., which, according to Mr. William Martin, ‘Outlines,’ p. 8, should be excluded from the list of extraneous fossils.

GRASS, Gramen, in Botany, See Gramina.

To enumerate all the species of grasses which are found growing naturally in England, would greatly exceed the bounds which can be allowed for this article; it will suffice, therefore, to mention a few species, which are either used in medicine, or cultivated as a pabulum for cattle; for there is scarcely a pasture in this country where great numbers of different species are not to be found intermixed. Mr. Ray has ranged them in the following order, viz. wheat-grasses, rye-grasses, dandel-grasses, panic-grasses, canary-grasses, fox-tail-grasses, cat’s-tail-grasses, hedgehog-grasses, crested-grasses, oat-grasses, cock’s-foot-grasses, buck-grasses, and millet-grasses. These and other grasses Limnaeus has arranged into distinct genera. See the following articles:

GRASS, Arrow-headed. See Triglochin.
GRASS, Bent. See Agrostis.
GRASS, Bird. See Bird-grasses.
GRASS, Canary. See Phalaris.
GRASS, Capon’s-tail. See Fenteca.
GRASS, Cat’s-tail. See Phylium.
GRASS, Clover. See Trefoil.
GRASS, Cock’s-tail. See Dactylis.
GRASS, Cotton. See Ereophorum.
GRASS, Couch. See Trifolium.
GRASS, Crested. See Dog’s-tail-grasses and Cynosurus.
GRASS, Dog’s-tail. See Trifolium and Agrostis.
GRASS, Zed-dog’s, a name sometimes given to the double spiked scaber, of Triticum. See Secale.
GRASS, Dog’s-tail. See Dog’s-tail-grasses and Cynosurus.
GRASS, Epeium. See Festuca.
GRASS, Fox-tail. See Alopecurus.
GRASS, Goose. See Asperugo.
GRASS, Hair. See Aria.
GRASS, Hard-tail. See Lagurus.
GRASS, Knot. See Polygus.
GRASS, Knot, German. See Sceletanthus.
GRASS, Knob, Mountain, and Verticillate. See Illecebrum.

GRASS, Love, or Quaking. See Briza.
GRASS, Meadow. See Poa.
GRASS, Hard meadow. See Cynosurus.
GRASS, Miller. See Milium.

GRASS, Oat, a name given to a species of the field. See also Avena.

GRASS, Panic. See Panicum.
GRASS of Parnassus. See Parnassia.
GRASS, Pepper. See Persicaria.
GRASS, Pudding. See Mentha.
GRASS, Quaking. See Briza.
GRASS, Rattle. See Peduncularis.
GRASS, Rush. See Spicibus.
GRASS, Rye, or Ray. See Lolium and Hordeum.

GRASS, Scorpon. See Scrophorus.
It is also asserted by Mr. Kent, that meadow and pasture-land is often neglected than ploughed ground, notwithstanding it generally admits of a much greater proportion of improvement. The best grazes cannot be collected at too great an expense; for he has seen a small spot of land, in the middle of a large piece, which was laid down twelve or fourteen years since, by the writer noticed above, upon an estate in Herefordshire, with some choice feeds, at the same time when the remainder of the field was laid down with common feeds; and that this spot is considerably better than the rest. From these experiments, and his own observations, he is clearly of opinion, that any person who has land calculated for grass may improve it, by this method of laying it down, to a much greater degree than he can in the common way. Dr. Anderson has likewise observed, in the second volume of his essays, that although it is probable, that none of the grazes that have been hitherto cultivated by the farmer are of the most proper kind for pasture; yet there is little reason to doubt but that many of the most valuable kinds for this purpose would admit of being cultivated with the same care as some of these are with which we are well acquainted, if they were properly separated from others, and cultivated with equal care. But so long as we shall remain ignorant of the peculiar qualities of each kind of grass, so as not to be able to distinguish the good from the bad, it is not surprising, that we should remain firmly persuaded that nature alone can provide valuable pastures, and that age is so essentially necessary for bringing them to their ultimate perfection. For, if we allow our fields to remain uncultivated, be it without having fowed them with any kind of grass-seeds, it must ever happen, that the seeds of such grasses as are brought by the wind, or otherwise, from the neighbouring fields, will there take root, and in time establish themselves. And as it may sometimes happen, that some of the most valuable pasture-grasses may there abound; the field, in these cases, will become filled with their seeds, and in due time may afford the most valuable pasture. But if bad kinds of grasses should abound in the neighbourhood more than the good, the field will as naturally become filled with the feeds of these useless plants. And as a number of these are hardy and abiding plants, if the field is once filled with them, the pasture will be, of consequence, always of little value, if it should be allowed to remain undisturbed for any length of time. Let the reader, therefore, consider how numerous the circumstances are that must accidentally concur together before it is possible to expect a very fine field of pasture-grasses, if left to nature; and then he will perceive how improbable it is that all these should concur to produce their full effect in any one field whatever. There must be roots of bad grasses, nor feeds of robust annuals, in the soil when it is left out from tillage; and the feeds of the most valuable kinds of grasses must be in the neighbourhood in such abundance as to fill the whole field sufficiently at once. Nor is this all. For as there is, no doubt, a considerable variety of valuable kinds of grasses, some of which are naturally fitted to grow to perfection on one kind of soil, or upon that soil when in certain circumstances, while others would thrive best upon another soil, or upon that soil only in certain peculiar circumstances; it must so happen, that these various plants which are best adapted to the soil in the state it may be in at the time, should be found in abundance in the neighbourhood of the field. Neither must there be found near that, any sort of robust quick-growing plant, the feeds of which, by being blown upon that field, might suddenly run up and suffocate in their infancy these tender and valuable plants. Nor must there be found any bad kinds of grass, that, by being established along with the good in

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any proportion, might tend to diminish the value of the
patture.

Now, let any one reflect on the infinite diversity these
few particulars may admit of, and think how utterly impos-
stable it is that all the favourable circumstances, without any
of those that are unfavourable, should concur in any one
ease, and he will acknowledge, that those who found their
hope of obtaining the most valuable pastures only upon the
fortuitous concurrence of all these circumstances, or who
imagine that every pasture which is old muid, on that ac-
count, of necessity be good, act in direct contradiction to the
plainest dictates of reason and common-fense. For, although it
should be allowed that the grasses hitherto cultivated are not of
the most proper fort for forming good pastures, and that
therefore, on some occasions, much better natural pastures
may be met with than could be formed by means of any of
those; yet it by no means follows from there, that if the
farmer were perfectly acquainted with the value and distin-
guishing qualities of each kind of natural grass, and knew
how to select and culture that best agreed with the local
soil and culture that best agreed with it, and every other particular relating to the
soil and culture there, he might not perhaps have it in his power
to form artificial pastures as much excelling the natural as
these last at present usually exceeded the farmer. For were
he possessed of the knowledge above supposed, he could at
once fill the void with the seeds of those valuable grasses
which he knew were best adapted to it, and thus effectually
exclude the admixture of every useless plant, or pernicious
kind of grass, that might be brought from the neighbouring
fields by the wind, or other accidental causes.

Let us, therefore, instead of contenting ourselves on all
occasions with such pastures or grass-lands as nature may af-
ford, rather study to improve those that are indifferent, by
endeavouring to obtain a knowledge of such plants as might
afford the most valuable pasture, and cultivating these with
affinity and care. The attention of the improving farmers
in Great Britain to this subject has been truly amazing.
But it is hoped the attempts that have been made by some
late writers may have the effect of turning their attention to a
subject of such great importance, with regard to which, they
all too doubtless make many valuable improve-
ments. I. is, however, to be feared, that till some attempt
shall be made to ascertained the particular qualities and pecu-
larities of the different kinds of grasses, the public will be
often imposed upon by specious accounts of new grasses,
which may be really polishe'd of few valuable qualities, and
may very much tend to discourage the inquirer. It is con-
fsequently necessary to sink all endeavours to discover
what are the particular purposes for which any one plant
would be deemed valuable, and in what respects it might be
looked upon as of no value at all: For, as there is no plant
that can be alike useful on all occasions, if we lose sight of
this most necessary definition, it may often happen, that we
may attempt to rear a particular plant for purge: which it
was never fitted to answer; and our want of success in these
trials may make it be entirely rejected, even in cases for which
it was extremely proper and beneficial.

It is flated that ray-grains continues to be the only grass
whose seeds can be purchased for the purpose of laying
down meadow and pasturage-land; and how inadequate that
grats is for such a purpose is known to every intelligent
farmer. Why indeed the loliun perenne (ray or eye-gras) should originally have been made use of in preference to all
the other grasses, cannot, perhaps, be satisfactorily account-
ed for: most probably it owes its introduction to accident, or
to its being a common graft whose seeds were easily collected,
rather than to its being preferred from any investigation of
its merits compared with the others. However this may be,
there appears to be no reason for excluding the others; for
it would appear exceedingly improbable, that of upwards of
a hundred grasses, taking the word grasses in its strictest
sense, that are growing wild in this country, the Author of nature
must have created only one as suitable to be cultivated for
patture or fodder. Since this period, however, most of
the natural grasses have been cultivated for the purpose of
affording feed, which may be procured genuine from many
feeders in most places. Taking it for granted then, that
there are other grasses superior in many respects to the ray-
grass, this question naturally arises—How comes it that they
have not found their way into general use? To this it may be
answered, improvements in any science, but more especially
in agriculture, are slow in their advances; and perhaps
no chefs of men adores more pertinaciously to old pre-
judices than that of farmers, and the difficulty of
distinguishing the grasses from each other has, too, no doubt,
proved one great obstacle: many of these plants are so
much alike, that the farmer in seeking out one of them is
to know some of them apart: is to, how easily may the
husbandman be deterred from the arduous task? There is
another cause also which may have operated against their
introduction: grasses, as well as other plants, have been
frequently recommended from a partial and limited obser-
vation of them, by persons who neither knew them well
as botanists or agriculturists, or who have recom-
manded them, merely to gain by the credulity of the
public. But, perhaps, the chief reason has been, that
persons who might be expected to make the improve-
ments, have not had the means fairly put into their hands to
make the experiment, there not having been any easy means
of obtaining such sorts of grass feeds as may be moll fit-
able for the purpose. It appears, however, that in the herbage
of good meadows, or grass lands, there should be a combina-
tion of produce, rateable land, and early growth. The first
is, in moss cafes, the agriculturist's grand object, and no
wonder, since it is the quantity chiefly which enables him
to pay his rent, and support his cattle; to obtain this, the
judicious husbandman has no expense in labour or manure.
But it does not follow that produce is to be attended to
solely, or that, for its sake, we are to cultivate rough cock's-
foot grasses, meadow-sweet, and such coarse plants. Grasses
which have been recommended for being remarkably grate-
ful to cattle, as the sheep's-fence grasses, or for the sweet-
ness of their foliage merely, if they are found to be defici-
ent in the grand article of produce, will never an'yer the
farmer's or grazier's purpose, since to be a good meadow it
must be productive. Cattle, in regard to food, doubtless
have their particular likings, though we cannot properly
judge of it, in which it may be necessary sometimes to indulge
them; but this practice must not be carried too far; for as
the farmer cannot afford to feed his ploughmen on pigs and
poultry, neither can he indulge his cattle in general with the
finer or more delicate hay or herbage. By the bye, we do
not know but that the most productive grasses may also be
the moSt nutritious, or that cattle will not as eagerly eat the
herbage or hay made of the meadow fox-tail gras, as of the
fine bent (agrostis capillaris), and proccum bent (trifolium prenchesium). Moreover, cattle are known fre-
quentiy to thrive on food to which they are habituated by
necessity, though at first they could scarcely be prevailed on
to touch it. Persons, in making experiments, are very apt,
as has been already observed, to conclude too hastily from
the appearance which a plant affumes on its being first planted
or sown; the molt insignificant vegetable will oft enc make a
great show, when its fibres have firsh earth to shoot into; but
but the trial comes when the object of our experiment has been in a meadow or pasture several years, when its fibres from long growth are matted together, and it meets with powerful neighbours to dispute every inch of ground with it; if it then continues to be productive, it must have merit. We see that lucern, when left to itself, is soon overpowered; if we sow broad-leaved clover, which is most undoubtedly a perennial, the first year we shall have a great crop of clover; let this field be left to itself, and the clover, like the lucern, will yearly diminish, not because it is a biennial, as some have supposed, but because plants harder or more congenial to the soil usurp its place; this flows, then, that at the fame time that we introduce a good plant, that plant must also be a powerful one, able to keep possession, and continue to be productive.

With regard to the second quality, or that of the cattle's thriving on the food they eat; this is, undoubtedly, of great consequence, and it is to be regretted that our knowledge of the most nutritive herbage is so limited; of those plants which have been cultivated, we are able to speak with some certainty; it is well known that clover, lucern, saintfoin, tares, and several other plants, have a tendency to fatten cattle; but what grasses, or other plants, which have not been subjected to a separate cultivation, have this particular tendency, remains to be ascertained by experiment. But as leguminous plants, in general, are found to agree with cattle, we may reasonably conclude that a certain quantity of them must be proper in pastures. Certain pastures are found to be more batable or feeding than others; but whether this springs from situation, or their particular produce, remains also to be discovered by further observation.

Respecting the third quality, or the early growth of plants, as the farmers and graziers unceasingly complain of the want of early herbage in the spring; those plants, therefore, which are found to put forth early foliage, and to be grateful to cattle, are deserving of great attention. As far as grasses are concerned, the sweet-scented vernal, the meadow fox-tail, the smooth and rough-stalked meadow-grasses, will effect all that can be expected from those of British growth: much, very much, however, will depend on seafsons: if the winter be very severe, or north-easterly winds prevail in the spring, grassy herbage will be backward: to counteract the bad effects of such seafons, our pastures should be warmly situated, not drains with moisture, sheltered by thick hedges, and divided into small enclosures: in short, a set of enclosures should be formed for this very purpose, where there is a prospect of its answering the designs of the cultivator. But where early pasturage is the deideratum, other plants, as well as grasses, may delver a place amongst them, as rib-wort, or rib-grasfs (plantago lanceolata), dandelion (arctium lappa), broad-leaved clover (trifolium pratense), with many others of the same kind. And as an early herbage, though it is valuable for pasturage, is no less so for hay; by the middle of May at thefeh, a meadow of this fort would be fit for mowing, and the second hay-making might commence by the time that hay-making usually takes place in the country. The writer has sometimes thought, but perhaps the idea is too speculative, that we ought to have two forts of meadows, one for hay, the other for pasture; that our hay-meadows should confit entirely of grasses, and chiefly for this reafon, that the hay would on that account be much sooner made; an object of consequence at all times, but more so when the proceds commencs in May. In June and July the more powerful heat of the sun is able to efticicate the thick leaves and stalks of the more succulent plants; but, in the neceffary prolongation of this benefice, the grasses must materially fuffer. But for the purpose of paflurage, the attention of the agriculturist should be chiefly directed to such forts of grasses as have the propensity of running to leaves, in preference to such as abound more in flower-flaks or items.

The fame writer states, that if we examine our meadows, pastures, and downs, we shall find them pretty much in a flate of nature, and, excepting those pastures which of later years have been fown with ray-grasfs and clover, full of an indiscriminate mixture of plants, some of which afford good, others bad food, some good crops, others fearely any crops at all; but that he may not be thought to speak at random on this subjece, he will flate a few facts to corroborate what he has allered. His worthy and much-efteemed friend, Thomas White, efq. with a view to ascertain the produce of several downs and commons fed on by sheep, procured, from each of those under-mentioned in Hampshire and Suffex, a turf, which, though not more than fix inches in diameter, and chosen indifferemtly, produced, on being planted in his garden, as follows:

**Different Turfs.**

**Turf from Selborne-Common.**—Plantago lanceolata, agrostis capillaris, avena flavecens, dactylis glomerata, felta du rincula, poa annua, cynodon crinitus, trifolium repens, crepis tectorum, achillea millefolium, galium verum, hypoch eris radicata, hieracium pilosella, thymus feryllum.

**Turf from Oakham.**—Trifolium repens, holcus lanatus, poa annua, agrostis capillaris, agrostis paludiris.

**Turf from Devon.**—Ranunculus repens, litorum perenne, holcus lanatus, prunella vulgaris, felta durincula, agrostis paludiris, trifolium repens, crepis tectorum, achillea mille folium.

**Turf from Glynd-llill.**—Medicago lupulina, achillea mil folum, poa pratensis.

**Turf from the fame.**—Avena flavecens, felta durinclula, felta ovina, hieracium pilosella, agrostis capillaris, trifiolium repens, thy us feryllum.

**Turf from Short-Heath.**—Feltula bromoides, aira pracoz, junceus campeliris, poa annua, agrostis capillaris.

**Turf from Mount Cabron.**—Rumex acetofa, daucus carota, medicago lupulina, potentirium fanguiforba, felta durincula, avena flavecens.

**Turf from Ringer-Dow.**—Liumnatharticum, sechio boa columnaria, ornithopus perpusillus, avena flavecens, felta durincula, trifolium repens, hypoch eris radicata, crepis tectorum, lotus corniculatus, junceus campeliris, hieracium pilosella, felta ovina, thymus feryllum, poa pratensis.

It is, perhaps, no small recommendation to the poa trivialis, that it is a principal grasp in that uncommonly productive meadow near Salisbury, mentioned by Stillingslees, and more particularly described in the first volume of the Memoirs of the Bath Agricultural Society. And that the account given of the extraordinary fertility of this meadow excited his curiosity, and induced him to request a gentleman residing near the spot to favour him with six small turfs, cut up in different parts of the said meadow, and which being planted in his garden, at Lambeth-Marl, produced as follows:

**Different Turfs.**

**Turf 1.**—Poa trivialis, ranunculus acri, triticiem repens, agrostis paludiris.

**Turf 2.**—Poa trivialis, alopecurus pratensis, triticiem repens.

**Turf 3.**—Poa trivialis, agrostis paludiris.

**Turf 4.**—Poa trivialis, triticiem repens, peucedanum filaus.

4 L 7

**Turf 5.**—
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Thref 5.—Po a trivialis, alopecurus pratensis, agrisia paludis, avena clation, triticum repens.

This experience proves, in a great degree at least, what he long before suspected, that the extraordinary fertility of this meadow arose not from any new grases peculiar to it, but from several unusual circumstances concurring and favoring in an uncommon degree the growth of certain well-known grases, especially the poa trivialis and agrisia paludis; consequently, in the forming and improving of grases-lands, the most certain plan will be to cultivate the seeds of such grases as may be most adapted to them, and afterwards sow them at proper seasons upon the lands, when they have been put into a suitable condition for their reception.

The directions given are, that if a piece of ground can be had that is neither very moist nor very dry, it will answer for all the seeds; they may then be sown on one spot; but if such a piece cannot be obtained, they must be sown on separate spots, according to their respective qualities, no matter whether in a garden, a nursey, or a field, provided it be well secured and clean. Dig up the ground, level, and rake it; then sow each kind of seed thinly in a separate row, each row nine or twelve inches apart, and cover them over lightly with the earth; the latter end of August or beginning of September will be the most proper time for this business. If the weather be not uncommonly dry, the seeds will quickly vegetate; and the only attention they will require will be to be carefully weeded: in about a fortnight from their coming up, such of the plants as grow thickly together may be thinned, and those which are taken up transplanted, so as to make more rows of the same grases. If the winter should be very severe, though natives, as seedlings, they may receive injury; therefore it will not be amiss to protect them with mats, fern, or by some other contrivance. Advantage should also be taken of the first dry weather in the spring, to roll or tread them down, in order to flatten their roots in the earth, which the frost generally loosen; care must still be taken to keep them perfectly clear from weeds. As the spring advances, many of them will throw up their flowering stems, and some of them will continue to do so all the summer. As the seed in each spike or panicle ripens, it must be very carefully gathered, and sown in the autumn, at which time the roots of the original plants, which will now bear separating, should be divided and transplanted, so as to form more rows: the roots of the smooth-flaked meadow-grases in particular, creeping like couch-grases, may readily be increased in this way; and thus, by degrees, a large plantation of these grases may be formed, and much feed collected for the use of the agriculturist. But a more ready way, according to a late writer, is, for the farmer to notice that species of grases most affected by his soil, and carefully to gather the seed from a piece of old meadow, purposely left three or four weeks longer than common, or at least long enough to become sufficiently ripe. He should not scruple the trouble of selecting the heads as they lie in the swath; but they who desire not to be so particular, will thresh out the seed together, either in the field or before it shall have heated in the mow. And good seeds of different sorts of grases may now also be procured from different seedsmen in large towns and other places; but the collection under the title of hay-seeds should never be trusted in any respect. Mr. Curtis, from the numerous applications that were made to him by gentlemen for grases-seeds, was induced to select such as appeared to him the most useful, and thereby rendered the public an essential service. He wished at least to put it in their power to decide on a matter which had been long agitated, and from which he was far from being the only one that entertained the f Omnigene hopes of its proving a great national advantage. The grases he has recommended will, he is confident, do all that our natural grases can do: they are six of those which constitute the bulk of our best pastures; most of them are early, all of them are productive, and they are adapted to such soils and situations as are proper for meadows and pastures. But, let no one expect them to perform wonders; for after all they are but grases, and as such are liable to produce great or small crops, according to particular seasons, or to the fertility or barrenness of the soil on which they are sown and cultivated.

This lift comprehends the anthoxanthum odoratus, or sweet-scented vernal-grases; the alopecurus pratensis, or meadow fox-tail grases; the poa pratensis, or smooth-flaked meadow grases; the poa trivialis, or rough-flaked meadow grases; the fijlula pratensis, or meadow-foes grases; and the cynarum crepatus, or crested dog's-tail grases; of which representations may be seen at figs. 1, 2, 3, in Plate Grases, Agriculture, and figs. 1, 2, 3, in Plate Grases; but more full accounts of them may be found by referring to their different botanical titles, in different parts of the work.

But of the above grases, the meadow fox-tail and rough-flaked meadow grases are tift for moist land; the meadow-foes, or sweet-scented vernal, are the most proper for land either moist or moderately dry; and the smooth-flaked meadow-grases and crested dog's-tail are those that are best suited for dry pastures and other similar lands.

It is, however, supposed, that in the more southern parts of the kingdom we may in vain expect to clothe dry soils with the constant verdure of grases; they will not stand the drought of hot parching summers: in such seasons, they are only plants which send down roots to a great depth that can be expected to look green or be productive, as the lotus corniculatus, medicago falkata, and some others.


It is observed that many more grases might be added to this list, and those too which perhaps might be highly deserving of it; but he has his doubts, whether by recommending more he might not increase the difficulty of introducing grases-seeds without any adequate advantage in return.

But besides these, the fijlula ovina, or sheep-foe grases; the fijlula turgida, or hard-foe grases; the poa composita, or flat-meadow grases; the poa palustris, or marsh-meadow grases; the pheum nodosum, or knot-grases; and the holcus ferrugineus, or rye-grases, which is a useful grases in many cases; may all be employed with advantage. They may be seen at figs. 1, 2, 3, in Plate Grases, and at figs. 1, 2, 3, in Plate Grases.

And in the second volume of his Essays on Rural Affairs, Dr. Anderson has likewise given descriptions of many others, which, he conceives, may be beneficially employed in forming grases-lands, such as the alopecurus balticus, or buffalo fox-tail grases; the fijlula rubra, or purple foe-grases; the holcus mollis, or creeping foet grases; the plantago angelica and tenax, or narrow-leaved and small grases-graced plantain or rib-grases; and the poa procumbens, or creeping-meadow grases.

In a valuable "Essay on the Conversion of Grases-Land into Tillage," inserted in the Communications to the Board of Agriculture, vol. iii. part 1. the following detail of several plants of the grases kind is given, with the soils they
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are most proper for, or on which they succeed to the greatest advantage.

"Ray-grass (Lolium perenne). This grass, which for many purposes is a very valuable one, is chiefly to be recommended for the two divisions of soil distinguished under the titles of loam and sand. It will flourish on any land, except stiff clay, and will grow even on that; but, upon rich lands and loams, it becomes not only a good spring-grass, but, if properly managed by due mixtures, turns out well as a permanent pasture-land; always, however, most valuable by being sheep-fed, for which it is singularly adapted. Mr. Pennec's two varieties of it are sold by

some persons who have tried them, to be superior to the common sort. Mr. Professor Martyn, he says, lates the Agrostis tenuis, poa nemoralis, bromus mollis, alopecurus, anthoxanthum, and poa pratensis, as all being earlier than the Lolium perenne, or ray. See Lolium Perenne.

"Yorkshire white (Bolus lanatus). This, he observes, flourishes well on any moisl foil, and grows very generally, except on the more dry and barren ones, where, however, it is also found. It should be taw chiefly with a view to beeping, for it is not equally good for other flock: many acres of it have been cultivated on his farm for sheep, and it has answered very well when kept clofè fed. Mr. Marigall, in his Midland Counties, mentions it as a good grass for cows and other cattle, but bad for horses. In his York Economy he, however, condemns it in toto; probably from not then having it clofèly remarked its qualities. See Holcus Lanatus.

"Meadow foxtail (Alpecurus pratensis). This is an excellent grass for good loams and clayey soils, and he has found it abounds largely on dry loams. He has laid down some parts of fields with it for comparison with other grasses on wet, sandy loams on a clay marle bottom, worth 14s. or 15s. an acre; but has found it giving way in four years to the plants more indigenous to the soil. He does not think there is any better grass for either hay or pasturage, and it yields feed in great abundance. He adds, that colonel St. Leger was, he believes, the first who entered largely into the culture of this grass; and Mr. Majendie, of Effex, revived it, and began with the Alopecurus. See Festuca Pratensis.

"Meadow foxtail (Alpecurus pratensis). He thinks that for moist loams and chays, there cannot be a better grass than this: it is very early, and it abides on his farm after nine or ten years on the soils upon which the meadow-foxtail gives way to others. It has also been found, by Mr. Majendie, harder against foils than the poa trivialis, the greatest objection to it being the difficulty of getting the seed in any degree of plenty; there is an infect that feeds on it, and occasions much disappointment. Mr. Professor Martyn, in his excellent "Flora Rustica," speaks, he observes, highly of this grass, and says the seeds may be collected without much difficulty; but he does not tincred advert to the infect which is so pernicious, as noticed by Mr. Majendie, and by the ingenious Mr. Swayne, in his "Gramina Palus.

In a field on his farm, where it is very well established, and the herbage thick, it produces very few foed-dawks." See Alopecurus Pratensis.

"Crested dog's-tail grass (Cynosurus cristatus). It is re-

marked, that to judge from the appearance of the bents of this grass in poor upland but moist pastures, a man would think it a very unpromising plant; but the rich marlines of Bridgewater and Bolton, the famous pastures of Pembton in Devonshire, and those close to Mr. Fuller's caile near Ulkeard in Cornwall, Mr. Thorne's bullock-grades, by linnet-ternes bottom near Tavilock, Miss Williams's at Little Malvern in Worcestershire, (which are among the richist

pastures in the kingdom), all abound, he afferts, very greatly in this grass; in some of them it is the predominant herbage. Mr. Marshall, in his York Economy, places it as the most prevailing plant in the best-grass meadows of the vale of Pickering, some of which will feed a large cow from May-day to Michaelmas. Very fortunately it abounds much with feed, so that he has had many buffels gathered in a feast on poor women and children, at one filling a pound, and laid down many acres with it successfully. At-
tention should be paid to its being ripe; for he once ordered eight buffels to be fown on eight acres, and it failed from deficiency in ripeness. See Cynosurus Cristatus.

"Roughed-dalked meadow-grass (Poa trivialis). It is observed that Mr. Boys, of Bethanger, in Kent, has been the largest cultivator of this grass in the kingdom, and sold large quantities of the feed, but gave it up for want of a demand. It is, he afferts, an excellent grass on good, found, and moist loams. It is accounted in Lombardy the queen of meadow plants (la regina dell'erba), whether for dry pastures or water meadows; multiplying itself much by seed, and little by the root; so that, if attention be not paid to permit some feed to fail, its quantity will febbly diminish. Excellent for all sorts of cattle.

"This hint concerning the feed is worth attention in England. Major Cartwright has found the poa pratensis to be an excellent grass on rich loams; and both succeeded well with Mr Williams, of Harleyford. See Poa Trivialis.

"Cock's foot (Dailya glomerata). This grass has been largely cultivated over the farm he now manages, and to his satisfaction on wet loams on a clay marle bottom, upon which the finer grasses are apt to give way in a few years to the indigenous produce. If suffered to rise high, it is very coicie; but, fed close, is a very valuable daff-pasture. Women and children make good earnings in gathering it as a buftel. He has now two buffels an acre, and the common red clover; and when the clover wears out, the grass fills the land, and abides well in it. It grows well in winter. It has been found highly useful as an early sheep feed."

It is rated in the Norfolk Report on Agriculture, that "for Mordaunt Martin, in 1788, observing, by an experiment, that this grass grew four inches in lefs than three days, determined to attend more particularly to it: he remarked, that when sheep were let out of a fold, they ran over every thing, to get at a bank that was full of it, and there ate it in preference to other grasses. In some parts of Norfolk it is called cows' grass, from their being very fond of it. He began to cultivate it in 1794. It grows at Midsummer, in a drought, when every thing else is burnt up. He fows it with nonch, instead of ray-grasfs, and finds it much more profitable." And "Mr. Overman, also, observing the cagerenfs with which sheep, when let into a fold at Bureham-market that had some cock's-foot grass in it, ran over ray-grasses, and every thing else, to get a bite of this plant, thought it worth cultivating, and loved about an acre, on the dry gravelly part of his farm, just above the marsh. This spot was the only one, in a large field, that did not burn in the severe drought of 1800, and convinced him of the excellence of the grass." He also flowed the writer "a beautiful crop of drilled wheat, which could scarcely be estimated at less than four quarters and a half per acre, pointed out a part of the field, inferior, if any thing, to the rest; and said it was an experiment on the cock's-foot grass; he had found it an excellent plant for sheep, but having examined the roots, perceived them to be so strong, that he had some fulfillment they might exhau-
the land, and therefore sowed this piece for a trial: the
result has satisfied him that all apprehension of the kind
was ill-founded, and he intends substituting it for ray-grafs.
The author has also "cultivated this grass on a large scale
for many years, and has found it of great use. It is a most
valuable plant when kept close fed." See Dactylis Glomera.

"Tall oat-grafs (avena elata). This is another coarse
grafs, profitable when kept close fed: the feed might be
had in any quantity from France, or gathered by hand in
England. In the Rev. Mr. Swayne's experiment, it
yielded a greater weight than any other grafts." See Avena Elata.

"Timothy grafts (phleum pratense). This grafts is repre-
sented by all travellers in America, he observes, as the
great support of cattle, &c. wherever Meadows are foun
and it is asserted to have considerable merit. He has several
times made the trial of keeping it close fed by sheep on a
moit loam, upon a clay marble bottom. The succes was
very encouraging: enough, he thinks, to prove that it is an
object, in this line of husbandry, which merits con-
iderable attention; and the more, as the meats are to be had,
very clean dressed, in any quantity from America, about
a guinea a bushel; which is sufficient, with other plants,
for four or five acres of land. He believes it is best adapted
to clay, moit loains, and espécially peat." See Phleum Pratense.

"Yarrow (achillea millefolium). This, he affests, is one
of the most common and most valuable plants that is to be
met with in England. On his farm the cultivation of it
has been carried on with succes as a sheep-paffure for some
years. It is found on moit loains almost equally with dry
burning sands, gravels, and chalks. It has a singular qua-
lity of refilling drought on the moit arid foids: to that,
if you fee at a distance a green spot on a burst-up, clofe-fed
paffure, twenty to one it is clothed with this plant.
It is found in the richef meadows and bullock-paffures.
Five fhillings per bushel are given for gathering the feed
in October: it is a plant deferving great attention Sheep
are very fond of it. It is faid to form a fourth-part of the
herbage of some of the fine meadows of Lombardy.
"Burnet (potentia fanguiforba). It is remarked that
there are large tracts of the meifl parts of the South Downs
upon which this plant forms half the indigenous pal turfage.
It abounds much alof on all other chalk downs; but it will
friifur on any foil, on fand, clay, fent, &c. Some writers
fpeak of it for cows: it has been cultivated on his farm
thefe five and twenty years for fheep, for which animal it is
very uful. The feed is to be bought almost everywhere," See Burnet.

And it is obferved in the Agricultural Survey of Nor-
fekfs, that this plant was "introduced at Stoke 35 years
ago, as the writer then related, with great succeds;
but it never made any progrefs, though it yielded luxu-
riant food for many horfes in February." However, "the
reputation of this plant attrafled the notice of Mr. Coke,
who formed an experiment at Holkham, to examine care-
fully its merits, and, with the spirit that characterizes his
husbandry, fowed 40 acres, mixing a fmall quanity of white
clover and rib-grafs with it. The refult was as defirable as
can be imagined; the field has been fully and incessantly
flocked with fheep, and was connantly pared as clofe to the
ground, as a favourite spot in a paffure is by horfes." And
in other refpects it is alfo uful, as "Mr. Bevan has
found it to be the moft wholesome food for fheep in a wet
spring, and a certain remedy for the flux." And he "is
never without twenty acres of it."

"White clover ( trifolium repens). It is afferted that this
plant has hitherto been the main dependence of thofe who
have laid down land to grafs; and though, for fheep, it has
not the fweetnefs of fome other plants, or of red clover, yet
upon the whole, it is one of the beft that can be relied on
for all rich or dry loains, fands, &c. and alfo for rich and
draincd clays and peats; but on poor wet loains and clays it
will not abide, but gives way to the water-grafs ( agrefis Taf-
lonfa) and noxious plants, or other indigenous grachts.
There is no better tell of good land, than its running fpon-
taneousity to this plant; from the fine loains on rock, upon
the Tamar, to the deep frabile ones of Leiceftershire, red-
clover, left unploughed, gives way to a thick covering of
this plant. Whatever feeds be fown, this clover fhould
form a part of the dependence for succeds. Mr. Bakewell,
Mr. Wright of Norfolk, and several other pratical farters,
made this obfervation, thatStock has been known to do
badly, though there was much food on the ground; per-
haps that is preficely the reafon; and that this plant, like fo
many others, demands very clofe feeding to difcover its
merit." See Clover.

"Trefoil ( medicago lupulina) . It is obferved that, though
only a biennial, it is fure to fheed fo much feed that it rarely
wears out of land. It is a good plant, not at all nice in fold,
and the feed cheap." See Trefoil.

"Cow-grafs ( trifolium medium). An exceilent plant for
ches and lrong loains. It is faid, in the Lincoln Report,
that Mr. Ancel got good crops on a rabbit land; the hint
is worth purfuing; but he has not been fecn it cultivated on
fuch foids. It is much more abiding than common clover. The
feed is always to be had: it is known also under the name of
marle grafs. Mr. Bakewell's method of laying down was,
by common red clover and ray grafs, being fure of plenty of
white clover and good graffes coming: but he prepared by
two crops of turnips in fucc elfion, and fowed with the barley
following. On fuch land as his, the practice is not to be
condemned, but on other foids it would fail entirely."

"Rib-grafs (plantago lanceolate). It is afferted that upon
rich lands and loains this plant gives a confiderable herbage,
and on poorer and drier foids it does well for fheep; but that
it is inferior to fome others. Mr. Mitchell obferves,
that it has flood the teft of years' eftablibhed practice
in Yorkfhire, and is in good eolution; though not well affec-
ted by horfes, and bad for hay, from retaining its fap. The
eminent Haller informs us, that the adornning richnefs of the
famous dairies of the Alps, decribed by Schenchez, is
attributed entirely to the plenty of this plant, and the alsbe-
illa vulgaris. The feed is always plentiful." See Plan-
tago.

"Lucern ( medicago fativa). This is more confined than
any of the other plants. A landlord fhould, he thinks, only
fipulate for it on very rich, deep, friable, dry, found, meadow,
loains, and fertile foids, worth 30s. an acre. Upon fuch
lands, he cannot do better than to encourage it among the
temantry, to be fown broad-cafl. 2ozs. an acre, and to re-
main while productive, which will be from twelve to fifteen
years. On fuch foids it will, he fays, support more cattle
than any other plant. See Lucern.

But more full accounts of thofe graffes will be found under
the different heads which are referred to.

With refpect to hay-feeds, it is flated that the only safe in
which these are admiffible, is when a perfon has a very clean
and valuable meadow or paffure which he faves with a view
for feed; drawing out the bad plants whilst the crop is on
the fowth, and threfhing the produce on a cloth, after fhed-
ing till the feeds be ripe. Thus managed, excellent feed
may
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may be procured with ease, and be beneficially employed in the forming of grass-lands.

In regard to the arrangement of these different grasses, as they relate to, or are proper for different sorts of soil, it is fully shown in speaking of the methods of bringing land into the state of grass or fowrd. See Laying LAND down to Grasf.

But besides the plants that have been noticed above, it is remarked that there are many others, some of which have been tried under his direction, which deserve much attention; but he has not named them in the above-mentioned list, because the feed cannot be procured but with difficulty: some perennial vetches, clovers, mellcots, lotus, &c. &c. And several others are highly spoken of by some writers; yet as his own trials have not been equally successful, he is not authorized to recommend them. He never tried the viscum flaminum sufficiently, to give an opinion of it; but, by Mr. Swayne’s account, it deserves much attention.

However, in considering the modes of laying lands to the state of fowrd, lists containing the proportions or quantities of different sorts of grass-feeding suitable for different sorts of land, are offered to the attention of the cultivator. See Laying LAND down to Grasf.

It is remarked in a general way by the same writer “that if the land laid to grass be intended for sheep, it is not an object of very great consequence to sow only the finer grasses; as clove feeding after the first year will make any grasses named in the lists fine, sweet, and productive; but this effect depends altogether on its being constantly fed clove, that is, all feed-lets being prevented from riting. Every good farmer is sensible of the necessity of this with ray-grasfs; but most unaccountably does not extend a similar concern to other grasses. Above 200 acres under the author’s management have been laid down to grass, chiefly for sheep; and he has fenced the fields fo early in spring, and so thickly, as just to keep down the feed-lets; the cock’s-foot, oat-grass, and Yorkshire white, with the management, have proved sweet feeding grasses, not at all rejected, even in fields where the fock had a choice. Several writers seem to have been very sensible of the consequence of clove feeding. Mr. Davis, in the Wiltshire Report, says, “the sweetarts of the seeds on the downs of Wiltz depends much more on its being kept clove, and eaten as fast as it grows, than on any particular good quality of the grass itself; for there are many downs that, when clove fed, appear to be a very sweet pasture, but which, if sufficed to run a year or two without a full flock on them, will become so coarse, that sheep will almost as soon starve as eat the grass.”

And in the Survey of the County of Stirling in Scotland, it is stated, that, upon Bedemond, &c. the parturing of sheep has evidently in the course of twenty years improved the quality of the herbage so as to raise grasfs of a good species, and in very considerable abundance, where nothing formerly prevailed but bad kinds of grasfs, and thence in no great plenty; and the practice bids fair to banish heath from all the places that are partured by sheep.”

Further, Mr. Bell, who was the chief writer on husbandry we had for many ages, also remarks, “that there are poor soils which require a much longer time to grow a second inch than the first; and that consequently on such it is much more profitable to keep sheep than cattle.” The writer, on first reading this passage, made the experiment on land of 12s. and 15s. an acre, clipping the plants with scissors, and carefully measuring and weighing the produce, and comparing it with neighbouring plants left to perfect the feed-let; the superiority was proportioned to the times of cutting. Sheep-feeding not only, he says, ameliorates, by enriching the soil and fining the herbage, but also by destroying weeds. Ragwort, with which the bullock-grounds of Lanark, in Ireland, are overrun for want of sheep is, it is observed, much affected by them; and Mr. Marshall, in his York Economy, gives an instance of a meadow, foul in the extreme with knoobweed, cured by parturing it repeatedly in the spring with sheep. But here, a counter remark must be made, which is, that after a field has been partured long with sheep, and clove fed, it becomes unable to yield a growth of hay: the plants, by being constantly cropped down, acquire a dwarfish habit, however quick the growth in that early stage. There is a small field on the estate which he manages, which has been under grass, time immemorial, and kept fed for the last forty years at least, except one year in which it was mown, expecting a valuable crop; the leafe was very favorable, but he was utterly disappointed, for the produce was small. He has known the same thing happen on including an old common.

In Scotland, a similar remark has been made by Mr. Wight. “Two enclosures on the same field were laid down together with grass-feeding of the same kind; after two years’ hay, the one was surrendered to parturing; from the other a crop of hay was taken every other year. After seven years’ absence, the proprietor returned home, and wanting more hay, moved both, and that which had been partured gave the worst crop.” Something like the same thing has been observed in Switzerland, as stated in the Transactions of the Berne Society. It has occurred also in other instances.

With regard to the forming of grasfs or fowrd, the procuring of good feed has been found, from long experience in every part of the kingdom, to be of all other works the most executed by tenants: they sow the cheapest feed which can be procured, that is, common clover or ray, or the rubbish of their hay-lofts: the clover gives a crop the first year; but, as it wears out, all sorts of trumpery succeed, if the feed be not good enough to run spontaneously to white clover. Great care should therefore be taken by the owners of lands, which are to be brought into a state of grass, to have proper sorts of grass-feeding provided. About 25s. will purchase the seeds in most instances; the expense may be reckoned from 20s. to 25s. per acre; but depending on various circumstances, as the state of markets, and the price of labour. Of the seeds recommended, the following are to be bought in any quantity: cow-grass, Yorkshire white, Timothy from America, white clover, trefoil, ray, burnet, rib. And dog’s-tail and cock’s-foot are easily gathered by hand. Most of the grass-feeding that have been recommended as useful in forming good grass-lands may indeed, now, or in the future, prove of service to the different feeders in London, and other places, as already noticed.

And the best methods of preparing the land, sowing the seeds, and managing the new graz-lands, are considered in treating of the practice of restoring arable lands to grasfs. See Laying LAND down to Grasfs.
the course of cropping on arable land. In all well cultivated districts, they, however, form a considerable proportion of the crops. The first of the above is a most invaluable plant, whether it be mown and used green, patured, or made into hay. By its long tap-roots it resists the effect of excessive drought on the dry-stemmed plants, and increases the quantity of vegetable mould in all. It will grow on moat land, but is not equally productive; and whether it be mown and used as green, patured, or made into hay, it generally produces four or five times the quantity of fodder that the same land would have done with common grasses. Further, in good rotations, it frequently makes the second crop, in lieu of white corn mown once, and the after-grasses eaten off with horsetails, beets, or sheep, and the land then sown with wheat. In that case, two pecks of the bell-ray-grasses, mixed with fourteen pounds of the clover-feed, should be sown upon an acre, which not only increases the quantity, but also greatly improves the quality of the hay. If the clover is for fall-feeding, the ray-grasses should be omitted. But in poor light soils, the better way is to take two or three crops of corn, and then lay the land down three, four, five, or six years. In this case, it is advised by the farmer should sow the following seeds, in these proportions per acre:

<table>
<thead>
<tr>
<th>Names of Seeds</th>
<th>Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of Burnet</td>
<td>4 pounds</td>
</tr>
<tr>
<td>Cow red-clover</td>
<td>4 ditto</td>
</tr>
<tr>
<td>White clover</td>
<td>8 ditto</td>
</tr>
<tr>
<td>Trefoil</td>
<td>4 ditto</td>
</tr>
<tr>
<td>Ray-grasses</td>
<td>2 pecks</td>
</tr>
<tr>
<td>Vernal grases</td>
<td>3/4 ditto</td>
</tr>
<tr>
<td>Sheep's-feather grases</td>
<td>1/2 ditto</td>
</tr>
<tr>
<td>Creaffed dog's-tail grases</td>
<td>1/2 ditto</td>
</tr>
</tbody>
</table>

"It is supposed, that by this management, the soil would acquire a vast increase of vegetable mould and, by the parterre maintaining one-fourth more stock than it did before, would be greatly charged with manure; by which means the land would be kept in perpetual good condition: and, when brought under tillage, produce one-fourth more corn than it did under other circumstances." And it is remarked, in the Norfolk Survey, that 'Mr. Puddiford was recommended by a friend, the management he had seen and approved, to sow his seeds at twice: half of each fort (white and red clover, and ray) at the time of sowing barley; and the other half before the rollers in going over the young crop: and this practice he intends to pursue in future. He thinks it will give them a better chance of succeeding. He has 6,000 acres of feeds: he lows the great quantity of 14 lb. an acre of white clover, 38 lb. of red, and one bushel of ray-grasses. The last he eateens much in spring; and, when an observation was made against it, said, that in April and May he had three thousand sheep that found the excellence of it." This should be attended to by the farmer. It was further stated, that "it was declared that, in 1754, in reverting the husbandry of that spirited cultivator of Holkham, it was remarked, that those who have been conversant in the husbandry of old improved countries, know that a common complaint is the failure of red-clover. It has been found to repeatedly, that the land is laid to be forfeited with it. In the same district it comes to nothing on the old improved lands, yet yields immense crops on any accidental spot, where never, or rarely, sown before. The observation is so common, that no doubt can remain of the fact; however, it may be attributed to certain methods in management pursued in this county. Peas and turnips had been tried as sublimates, but they are tillage-crops, and what they thin soils, harressed with the plough, want is, result. Mr. Coke, it is added, turned his views to a different and better quarter, to other artificial grasses, which would answer the same purpose as clover and ray-grasses. He had recommended to him, on a former occasion, trefoil, white clover, cow-grasses, rib-grasses, and burnet. Mr. Coke applied them with no inconsiderable facility to the present purpose, and, that the experiment might not be delusive, tried them spiritedly upon 50 acres in the middle of a large piece, laid with clover and ray-grasses. The quantities of feed he has found will vary according to circumstances; but, in general,

<table>
<thead>
<tr>
<th>Names of Seeds</th>
<th>Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of Cow-grasses</td>
<td>8 to 10 lb.</td>
</tr>
<tr>
<td>White clover</td>
<td>5 to 8 lb.</td>
</tr>
<tr>
<td>Rib</td>
<td>5 to 8 lb.</td>
</tr>
<tr>
<td>Burnet</td>
<td>5 to 12 lb.</td>
</tr>
<tr>
<td>Trefoil</td>
<td>5 to 8 lb.</td>
</tr>
</tbody>
</table>

according to the price, and also the intended duration of the hay. The success of the first trial induced him to lay down a yet larger space the second year. And the third (with the barst of the last spring), no fewer than 225 acres; this, in truth, says the writer, doing justice to a new husbandry. Mr. Coke has found that those feeds fill the land completely with plants, which are abiding two and even three years; and how much longer they may last, is more than he can pronounce, as their appearance is just as good as ever. The author rode over all the pieces, and never saw a finer or more regular plant than they exhibited. And he has, on several occasions, remarked, that sheep give a preference to these grasses, whenever sown in the same field with clover and ray-grasses. And it is added, that "in regard to the continuance of these trials, some of the pastures now remain, and are as fine as the soil will yield: thick, clean, and sweet." And it is here remarked in regard to land being tired of this plant, that the observation he made, "during nine years that he was in the constant habit of viewing the farm of Mr. Arbutnot, in Surrey, merits some attention. When he began to farm, the land was sick of clover, infomuch, that it was almost sure to fail, from having been, perhaps for a century, sown every four or five years. His friend adopted the course 1 lb. of burnt wheat; 2 lb. of beans; 3 lb. of cow-crafs, in which it occurred once in three years, and the farmers predicted an absolute failure: he viewed three courses, and better crops, of pure red clover, were never gained. He began with ploughing treble the depth of that to which the land had been usually stirred, and he manured very amply for every crop of beans, partly with night-soil, from London. In what degree the success arose from depth of tillage, and what degree from a variation in manuring, cannot be ascertained; but the experiment proved that those agents were equal to the cure of the malady." It is also further noticed, that "some farmers in Norfolk have moved out of the common sphere, and ventured to plough deeper than their predecessors; nor have they found any inconvenience in so doing. It merits consideration, whether this practice will not prove in some measure a remedy to the failure of clover. As to manuring, and especially in great variations, the means are generally limited, and a change in this respect, however desirable, is rarely in their power."

But, "the only effective remedy hitherto practised, is that of omitting clover altogether, for one or two rounds, which points out the great importance of introducing as many new artificial grasses as possible." See Red Clover.

The red-cow clover is another plant of the clover kind, which has been found very useful as an artificial grass. According to Mr. Amos it is perennial, and grows naturally in high chalky fields, and in gravelly fields with clay beneath. In the most improved part of the country, where the land is
to red for some years, this feed is sown along with the white clover, as it continues in the ground much longer than the meadow-trefoil, and is nearly as productive, especially on chalyke and poor lands of fort. And that where a crop of any of these clovers is taken in lieu of a crop of corn, the grain should be sown first, but in quantity than if no feeds were sown with it; and, after the land has been made fine by harrowing and rolling them, fourteen pounds of clover-feed, and two pecks of bell-ray-grafs, should be sown upon an acre bush-harrowed the length-way, and roll the crofs way of the ridges; afterwards the whole must be well gripped or drained. Nothing more is necessary to be done, on account of the seeds, till the next spring, when the land should be well driefed with the swath-dresher or harrows, drawn with long bulky thorns, the latter end of March, or the beginning of April; then cleaned and rolled the crofs way again. In all these operations, the land should be neither too wet nor too dry, but in a rude medium with respect to both these extremes, as, under other circumstances, they do not succeed so well.

The time for cutting those two grasses is, when they are in full flower, and rather flewing evidences of declining or palling their maturity. See Clover.

Lucerne, in Mr. Wright's opinion, the sweetest grass for all sorts of flock yet known, and makes the cloefest fward, and is very productive of foliage. Hence it is, he conceives it most peculiarly adapted to laying down land to pasture. It flourishes most upon rich, dry, warm soils; yet it will accommodate itself to moist kinds. It is seldom sown alone, unlefs it be to raise the feed; nor should it ever be mown for hay. In laying down rich woods, which are intended to remain in pasture for many years, this feed should predominate in the composition that is made use of. But in the Agricultural Report of Norfolk it is stated, that "Mr. Wright, of Stanlow, does not like white clover; he thinks it a bitter food, and that sheep do not eat it kindly; so that while much food seems to be on the ground, flock do badly. This is an uncommon opinion, but the writer remembers Mr. Bakewell starting the same idea." See White Clover.

The protracted or hop-trefoil, is another plant of this fort, which is not very productive, and thrives best upon dryish gravelly fields, and pastures which have the same nature. They are both perennial. See Duglows.

Mr. Amos says, the bell crops upon light rich land; but it will thrive upon the thinnest fiftone, gravelly, and chalky soils, with great luxuriance, even where these are so poor as to afford a very scanty crop of any of the other sorts of grasses. It thrives best when sown alone, though it is frequently sown with barley and oats, by cultivators that have not much experience of it. And it is advised, that upon whatever soil it is sown, the land should be brought into a very fine and clean tilth by culture. And, that about the latter end of March, or the beginning of April, it should be ploughed, and if it is roughish, be harrowed once in a place; then upon every acre, sixteen pecks of fainfion feed should be sown; then harrowing the land well, and fowing eight pounds of common red-clover or trefoil, upon every acre afterwards, the land should be bush-harrowed and rolled. And, where weeds appear, they must be destroyed as they come up, by hand, or other means. It is recommended, that no flock be suffered to graze upon the feed, the first year; and, that in the second year, there is a crop of com, rape or bone-dall to an acre, about old Michaelmas, the plants are greatly invigorated and benefited by the application.

It is further stated, that, upon such lands as the above, it furnishes a crop of hay in summer of greater consideration than any other of the artificial grasses. The hay is excellent for all kinds of flock, and the after-math very good for cattle in autumn, and for sheep in winter, till Christmas. Hence, fainfion is a most valuable grass on lime-land, gravelly, and chalky folis; but it requires three years in coming to perfection; hence the propriety of sowing common red-clover or trefoil along with it. And it should be mown before it is in full blossom, otherwise there may be lods in that way. See Saintfoin.

Lucern is afflicted, by the above writer, to be the most productive, and that which comes into use sooner than any other of the artificial grasses. Horfes, beefs, sheep and pigs, are very fond of it, when it is mown and given them green, which is the most useful application of it. It is found to thrive best on rich, dry, loamy soils, which should be made deep, fine, and clean of weeds by culture. And, he advises, that about the middle of April, ten pounds of feed should be drilled on an acre, in rows of eighteen inches asfender, and one inch deep, with a row of common red-clover between each; then bush-harrowed and rolled. Nothing more is necessary to be done till weeds appear, when it should be hand-hoed well, and the weeds in the rows pulled out by the hand. And when as more weeds appear, it must be hand-hoed and hand-weeded a second time, and even a third time, if necessary; when this is done, great care should be taken not to tred upon the young lucern. And as soon as it begins to blossom it should be mown, carried off, and given to the flock green. By this mode of application, it will, he says, keep more flock than any of the other grasses.

But this plant also requires three years in coming to perfection; hence the propriety of sowing common red-clover along with it. After that time, it may be mown three, four, or five times in a season. But, between every mowing, it should be well hand-weeded, and made quite clean of weeds. And every third year it should have a covering of rotten dung, after the rate of eight or ten tons to the acre, applied over it about Martinmas. See Lucern.

Burnet is a grass of the artificial kind, of which there are several varieties; but the only one worth cultivation in this country is the common fort. This plant, though little cultivated, is highly valuable, either green or in hay for horfes and cattle, and is an excellent winter food for sheep. It thrives in a dry, clean, light and deep soil; but it will grow very well on poor, gravelly, and chalky soils, which must be made clean and fine by culture. And it is advised by Mr. Amos, that, "about the middle or latter end of July the land should be ploughed for the last time, and harrowed well; after these operations, four pecks of feed should be sown broad-call upon every acre, and then bush-harrowed and rolled. And it is suggested, that as the proper reason for sowing it is the latter end of July, it becomes an excellent succedaneum to turnips, when they have been destroyed by the fly, which is often the case." And it is stated, that "the most profitable way of cultivating burnet is by sowing it with other feeds, when the land is to be laid down in these proportions:

<table>
<thead>
<tr>
<th>Name of Seed</th>
<th>Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Names of Seeds</td>
<td></td>
</tr>
<tr>
<td>Barnet-feed</td>
<td>- 1 peck</td>
</tr>
<tr>
<td>White clover</td>
<td>- 10 pounds</td>
</tr>
<tr>
<td>Trefoil</td>
<td>- 4 ditto</td>
</tr>
<tr>
<td>Vernal-grafs</td>
<td>- 2 pecks</td>
</tr>
<tr>
<td>Ray-grafs</td>
<td>- 2 ditto</td>
</tr>
<tr>
<td>Creshed dog's-tail</td>
<td>- 4 ditto</td>
</tr>
<tr>
<td>Sheep's-foene</td>
<td>- 4 ditto</td>
</tr>
</tbody>
</table>

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GRASS.

The land should be bush-harrowed and rolled, and afterwards kept clean of luxuriant weeds. It is, however, remarked, that "much as this has been extolled, yet it is seldom found either alone, or with other grass-seeds, since the introduction of red and white clover; though its greatest excellence is for winter-pasture in the feeds of sheep, &c."

See Burnet.

Chicory is likewise a plant of this description, which may be found highly beneficial on many poor sandy or gravelly soils, where other sorts of grasses cannot establish themselves. It is asserted, in the Norfolk Report, that "Mr. Bevan sowed an acre of poor land, worth not more than 2s. 6d. rent, with chicory in 1793, and that the next year it produced 7l. 10s. in feed." And the writer says, that he has taken several opportunities of recommending this grass in that district. On large tracts of poor land, he is confident it would increase the produce tenfold; and it well merited trial, he thinks, on every soil in it. The objection which has been founded on its not being easily extirpated, is, he contends, of no importance, for tares should be sown after it on some soils, and turnips on others, in which system, its distinction is unquestioned. This hint should not slip the notice of cultivators in other districts.

This is a plant of the kind, which is much employed as summer herbage, either polluted or mown green, as foiling for horses, &c.; for hay, as a substitute for red clover (on land that has been tired of growing it); for manure to be buried in by the plough; and for feed; hence the reason for sowing the seed of this tare will depend upon the ufe it is intended for. When for summer herbage, &c., it matters not how early the feed is sown, provided it has not hard frost ensuing. The first sowing may be as early in February as the season and condition of the soil will allow, and to continue the sowing at due intervals through the months of March and April, which will give a good opportunity for succedion of them, to the great convenience of summer-feeding, but when for depasturing, it will be prudent to wait till the tares have gained a sufficient increase of haunch, before the flock are turned in upon them. And when for foiling horses, &c., they should be mown before they flower; and in no instance should the haunch be suffered to become rotten near the surface of the ground, which frequently happens on rich soils and moist situations. If for hay, the tares should be sown as early as March as circumstances will allow; but the time of mowing is more optional. Some mow them when the blossoms are fuller; others, just before they are quite ripe. But, in either case, the same caution is necessary, as in making fair thin and clover into hay; and that is, to avoid breaking off the leaves, in which a great part of their virtue resides. When they are intended for manure, the feed should be sown as early in February as the season and condition of the soil will permit, and at the rate of four bushels to the acre. For this use they should be ploughed in before they get too long in their growth. But whatever is the intended ufe in cultivating this tare, the preparation of the land is the same; and this plant delivers most in light sandy soils; and, in every cafe the land should be ploughed and harrowed once in a place, before the feed is sown; then sow the feed broadcast at the rate of three bushels an acre for the first and second ufe, harrow the land well afterwards, and then lay it dry.

Summer Tare.—The great objects in cultivating this tare are, 1st, spring-feeding and summer-herbage for cattle and sheep, especially ewes and lambs. 2d. Hay, as a substitute for red-clover. 3d. Manure, to be buried in by the plough. And 4th. Seed. But whatever is the intended ufe of this tare, Au-
gust and September is the prime season for sowing the feed of it. As soon, therefore, as the ground can be cleared of its crop, the land should be ploughed and harrowed once in a place before the feed is sown upon it. And it answers extremely well simply as a spring-food, when sown with rye, in the proportion of six pecks of each to the acre. See Tare.

Where they can be cultivated, crops of this tare should never be neglected. See Artificial Grajes.

GRASS-Ground, in Gardening, the parts of ornamented grounds which are kept in the state of lawn short grass or fward. Tho' these spaces which are extended in the fronts of the houses or habitations, and are termed lawns, are mostly kept in short-grass, which, by their compact verdure, summer and winter, and open rural appearances, exhibit a fine imitation of nature at all seasons, especially when the side boundaries terminate in rural plantations in various natural curves and bendings. This mode of laying out pleasure grounds prevails much at present. But besides these it is the practice to have rural short-grass openings continued between the plantations throughout the different districts of ground of this fort, separating and bounding the shrubbery clumps, borders, and other parts, in some places widely spreading, in others more contracted; but, in either case, extending to the boundaries of the several plantation compartments, in various bendings, sweeps, and curves; by which the whole is rendered Ruraly ornamental, and at the same time more agreeable and easy to walk on than gravel between the plantations, when the weather is dry and hot during the summer season. In the ancient style of gardening, it was much the custom to have straight short-grass walks, both for ornament and common walking upon; but for ornament, unless elegantly wide and spaces, they have a littleness in their general appearance, as may be seen where long rows of short-grass-ground are extended to some distance, in the way of walks; and for the latter purpose they are very improper in winter and all moist weather; and even in summer in the mornings and evenings, as being always damp and dewy. Walks of this kind should therefore be but sparingly introduced; and where any are made for variety, ornament, or summer's walking, they should be as spacious as the situation admits, not less than from ten to fifteen feet wide, and even twenty feet wide or more, when the walk is considerably extended in length.

The method of forming short-grass-ground work is either by sowing the parts with grass seeds, or by laying them with turf cut from a fine field, common, or down; the latter of which, where it can be obtained at a moderate expense, is greatly preferable, as it not only at once forms a complete fward, but is generally more clofe, even, and smooth, as well as less apt to run up to better grass, grow rank, or rife in tufts, than by the following method. The sowing method is, however, much less expensive.

Preparations.—In preparing the ground either for sowing grass-seeds upon or laying with turf, the whole must be broken up equally to a moderate spade's depth, clearing out all the roots of perennial weeds and other coarse materials. When this has been done, flakes or wooden pegs with notches, for making the level, according to the position of the ground, must be driven in; then proceed with line and spade to rough-level the ground according to the marks or place before the pegs, after which treading, rolling, or ramming the whole down equally, that it may nowhere sink in hollows afterwards. When this has been finished, the levels should be brought up more accurately, and the whole finished with a neat raking, clearing off all large stones, and making an

even
GRA S S.

even and smooth surface; in this state it may either be fown with grass seed, or laid down with turf.

For the first method the proper season for sowing are either February, March, and April, or in August or September in moist weather. In moist weal forests the former is probably the best, but in those of a dry gravelly nature, the latter. In this business it is of the utmost importance to procure good seeds; those from hay-fields or out of hay-lofts are often used, which may answer well, where the hay was the growth of some fine pasture free from weeds, and naturally afforded fine turf when grazed and mowed; but in other cases there is often a mixture of various sorts with weeds, by which the sward is rendered irregular and foul, and never makes handsome short grass-grounds. If you are not furnished with seeds of your own, they must be obtained from the seedman, and should be of those kinds which strike deep root, spread out laterally in their tops, are permanent, and capable of resisting the effects of heat; there are many of this kind. (See Laying Land down to Grass.)

The seed must be fown broad-cast, very thick and regular over the surface, and directly raked or harrowed in; and when the surface is dry it should be rolled with a wooden roller, to bury the seeds more effectually, and make a smooth surface: when the grass comes up, all weeds should be removed; and the same season, when the sward is become thick and green, an advanced some inches in growth, it should be mown, rolled it well afterwards, and continue mowing it and rolling two or three times the first summer, especially if it were fown in spring, as, the oftener it is mown and felled, the thicker and finer it will grow; and if it is intended to keep the grass tolerably fine, mowing will be requisite once a week or fortnight, according to the growth from April to October, and rolling once a week or fortnight in moderately dry weather, and occasionally in the winter season. In this way a good turf may be formed in a few years.

In the second method, which should always be employed where it can with convenience, the best turf is that of a fine pastured common or down, where the sward is fine and short, with considerable cloves.

The best season for laying the turf is from September till March or April, though it will grow at almost any time of the year, even, if there be occasion, in the summer months.

The turf for this ufe is mostly cut or played with an iron instrument called the surfacing iron; all the turfs being cut of an equal width, length, and thickness: the proper size is a foot wide, a yard long, and about an inch in thickness. They should be fird marked by a line the proper width, length, and depth, and then cut with a racer or cutter, firt longways a foot wide, then across in yard lengths, proceeding afterwards to cut them up; having particular regard to cut them level, and all of an equal thickness, otherwise it will be impossible to lay them level. As they are cut they should be rolled each up clofe and tight, the grafs fide inwards, and piled up by tens, especially if they are cut by the hundred, which is mostly the cafe. This is ufonally done at from about a fhillin to fifteen pence the hundred, according to the nature of the foil, as, whether soft and easy to cut, or hard and ftony. A man will cut from three to five, fix, or even hundred a day, with a perfon to trace them out and roll them up as they are cut from the surface.

The method of laying them is very easy: they are placed regularly turf and turf, unmolding them as they are laid, joining them up quite clofe edge to edge, and making good all deficiencies of broken parts as the work proceeds; and as soon as laid, they should be well beaten with broad heavy wooden beaters, as flat pieces of elm or oak plank two inches thick, fifteen or eighteen inches long, and a foot broad, having long handles fixed flating in the middles of the upper sides. With these beat the grafs regularly all over, and then roll it well with a heavy iron or stone roller, repeating these operations in moist weather as there may be occasion.

When very dry hot weather succeeds, so as to occasion the turf to shrink and open at the joints, a good watering is of much advantage to it.

The management of short grass-ground, after it has been thus laid down, is that of mowing it in summer frequently, to keep it short and fine, like a patured down; polishing occasionally with a long pole, to scatter the worm-calls, which greatly deface all short grafs, and rolling it frequently both to take up the scattered worm-calls to make the surface clean, and to render it smooth, firm, and even in its appearance.

Mowing once a week, ten days, or a fortnight, or, according to its general growth, during the summer, is necessary, especially for the principal home lawns, and other short grass-grounds, in the most coniposite parts; which parts should always be kept very clofe and fine, like the sward of a fine patured down or common: it is performed with a short grafs- scythe; and dewy mornings, or moist weather, must always be chosen for the work, as it will be impossible to mow short grafs properly in dry weather. Previous to mowing, it is of advantage sometimes to pole and roll the grafs the day before it is intended to mow. In performing the work of mowing, proper attention is necessary not to score or leave the marks of the frokes of the scythe, which has a very unightly appearance; to prevent which, as much as possible, the point of the scythe should be laid out rather wide, an inch or two beyond the measure of heed and point, especially for very short grafs, keeping the point rather out, and not drawing that part too falt inwards, gathering the grafs neatly to the left in a range; and after having moved thus to the end of the swarth, to mow it lightly back again, in order to trim off all scores, and other irregularities, unavoidably left the first time in executing the work.

After it has been all thus mown over, proceed to sweep up the mowings of each swarth regularly, by standing in the middle, sweeping it along alternately to the right and left, to the end of the swarth, forming all the grafs in a range, and each range; then heaped in large heaps, and carry the whole off directly in a wheel-barrow, large baffle, or other contrivance for the purpose.

The business of polishing is performed by a long, taper, pliable, a pone pole, fifteen or eighteen feet long, by passing it backwards and forwards, in rather dry weather, so as to break and scatter the worm-calls about. The grafs should be afterwards rolled with a wooden roller, when the surface is a little moist, but not too wet, by which the earth will all adhere to the roller, and render the surface perfectly clean, the work being repeated, as there may be occasion, the year round; and in mowing-time, if the surface is foul, it is particularly necessary to pole and roll on the day previous to mowing, by which a clean smooth surface will be provided, so as to be able to mow clofe, even, and more expeditiously. See Poling.

In the rolling of short grass-ground, it should be performed occasionally with a wooden roller, and a heavy iron or stone roller: the wooden roller is proper after polishing, to clean up the worm-calls and smooth the surface, being performed when the surface is not very wet, especially if full of worm-calls, as it would otherwise platter and daub.

4 M 2
the grass, and render it unhealthily; the heavy iron, or stone roller, should be used occasionally, when the surface is dry, to press down all inequalities, to clofe as to preserve a firm, even, smooth surface. And in fine-kept short grass-grounds, the rolling should be performed occasionally a day or two before mowing, to settle the surface firm and smooth, which greatly contributes to the easy and exact performance of the work: the buffets of rolling in small, or but moderately large short grass-grounds, is mostly performed by men; but in very extensive grounds, it is sometimes done by a horse or having a large roller for the purpose, with shafts like a cart, and the horse at the same time wearing a fort of leather shoes, very broad at bottom, made so as to lace on occasionally, like men's half-boots, to prevent his feet cutting the surface in holes, and rendering it uneven, and of a bad appearance.

Where short grass-grounds are defined by wild daisies, dandelion, or other weeds, the first may be removed by having the blade of an old broad-favred fixed in the end of a long pliable pole, which, as it cuts both ways, by sweeping it backwards and forwards, it will head down the daisies at a great pace; which may be repeated two or three times a-week, or as often as may be occasion for it.

The others should be extirpated by means of an iron for the purpose, made in the form of a small docking-iron.

In the autumnal finishing mowings, the grasses should be generally cut down as close and even as possible, that the fward may remain in a neat even surface over the winter seafon, and appear well in the early spring.

These directions for the management of short ornamental grass-grounds, regard only such as are required to be kept constantly short, close, and even in the surface, as is necessary in the principal lawns, past, walks, and other divisions, situated within the limits of the main pleasure-ground. In the outward considerably extended districts, continued into fields, parks, &c. it is not necessary to have them cut so frequently; two or three common mowings in a summer, with occasional rollings afterwards, may be sufficient.

Grass-beth, in our Countrys, grazing, or turning up the earth with a plough. Hence the customary service for the inferior tenants of the manor of Amered in Oxfordshire, to bring their ploughs to do one day's work for their lord, was called grass-beth, or grass-burt.

Grass Husbands, that fort of husbandry which has a relation to the management of grass-land, or such as are under the condition of fward. This, in a great measure, conffit in the proper clearing, manuring, pâturing, or feeding down, futting up, cutting or moving, and the preparation of the crops. This fort of management is far from being perfectly understood in many parts of the kingdom, and consequently the grass-land is frequently in the moft coarse and wretched state, being over-run with various kinds of coarse and aquatic plants, as well as thofe of the grass, and other defcriptions. See Husbandry, Grass, Meadow, and Pasture.

Grass-land, that fort, or defcription of land, which is mostly preferred in a state of barbage or fward. The forts of land that are the moft adapted for this purpose are, according to fome late writers,

1st. Such as are fitated near large populous towns, where manure is cheap and plentiful, and where the produce of grass-land is constantly on demand, and, of course, dear.

2dly. Such lands as are placed on the banks of rivers and brooks, that may be improved by irrigation to a much higher value than can possibly be done under any other method of cultivation.

3dly. Such lands as lie in valies of mountainsous countries, especially chalky soils, where old meadow-land is

fearce and valuable, and the greater part of the arable land is
of that nature and quality, that it is impossible to convert it to good fward-land. And

4thly. All fuch cold strong ground of the grass kind, which, if ploughed up, would not be applicable to the purposes of the turnup-husbandry, or those of modern farming, and which, under the belt practice of wheat-husbandry, may not be fo valuable as they are at present in the condition of fward.

The forming of grass-land is effected with different degrees of difficulty in different climates; in some parts of the inland it is accomplished, in general, with great care and facility, the foil having a natural tendency to the production of grass herbage, when left in an unploughed state, reverting to pasture without labour, expence, or even the fowing of feed; while, in other cafes, all the art of man has been found ineffectual, to make good grass-land. Even after 20 years fruitless expectation and expence, the man-holders have often been obliged to restore the ground again to a state of tillage-husbandry.

It is remarked, that confequently the great difficulty in this husbanfy is to difcern what fort of land is fuitable and proper for grases, and that which is improper for the purpose. The belt meadow-land does not always make the belt tilage-land, nor does the belt arable-land always make the belt pasture, but frequently the reverse. To make this determination, it is necessary to consider well the pro-
cese of nature in propagating and perpetuating grases. The great object of nature is to perpetuate all her fpecies; but upon the plants created for the support of animals intended for the food and use of man, he seems to have bestowed more than ordinary care. Different kinds of animals propagate in different modes, some oviparously and some viviparously. Plants having no locomotive motion are endowed with a power of propagating in both modes. In trees and shrubs, and many kinds of plants, the afittance of man is required to obtain viviparous production, by grafting, budding, &c. But, in grases, nature does her own work, and that in both modes. We have only to attend to her examples, and we shall seldom err. In trees and shrubs, the bud is the viviparous production; in grases, the root performs the fame office. Grases are as much the offspring of roots as of seeds. Every new root contains the germ of a future plant; and, as the feed-talks of grases muft necessarily be frequently cropped by animals, nature makes up the deficiency by an increase from the roots. Most of the belt grases are, in their nature, biennial; but nature, by giving them the power of propagating by the root, has in effect made them perennial; a much more certain mode of propagation than by feed, as being increased instead of being injured by the biting and treating of animals, and by the produce being perfect in one year instead of waiting two, as in the production by feed. But this process does not go on successfully. unless the land is peculiarly apt for the production of grases. If it is too wet, the grases will be injured in the winter by rain and frost, and will soon be superceded by rushes and other aquatic plants; if too dry, they will be killed by the summer's heat, and give place to moles, fenn, heath, &c. No land will it is conceived, a make good meadow, unless it is deep enough to admit the roots of grases to run down out of the reach of the summer's heat, and that it be retentive enough to hold water just so long as to produce fermentation, with such an aborbent under-litatum as will drain it before putrefaction takes place.

Some proportion of grass-land should always be attached to every farm, in order that a proper and suitable supply of winter and summer feed may be provided for such animals as may

GRASS.
GRASS.

may be requisite in managing them, and also that adequate proportions of good manures may be raised; as, where this is not the case, it is impossible that farms can be well managed. And on all sorts of grass-lands, it is of much consequence to keep them as clear and free as possible from the growth of all sorts of coarse plants, those of the aquatic kind being removed by suitable drainage, and the application of different substances of the absorbent description to the surface of the land. They should likewise be carefully eradicated from the hedge-rows of grass-fields annually, and by that means be prevented from spreading themselves over the ground by their seeds. By this practice, the hedge-plants would also be greatly benefited. These sorts of lands should also be kept as clear as the nature of their application will admit, of all kinds of obstacles that impede the production of perfect sward, such as the growth of moss on their surfaces, and the continuance of cattle dung-hills, ant and mole hills, as well as thoe of ticks, flies, and other similar substances. The proper methods of removing these are noticed under their particular heads, and in speaking of meadow-lands, and pastures.

According to the Agricultural Survey of the County of Herts, in an experiment made by the Duke of Grafton, it was found to destroy moths, no. The material has been well turned up. It is advised that manure should be laid on at the same time: but that where ashes are spread out over the surface without harrowing, the moss plant is destroyed, and the grass greatly improved. And in other cases, much advantage has likewise been experienced from the application of fine sand over the sward, in an even but not too thick a manner. But the dung of animals should never be suffered to remain any length of time in heaps upon the surface of grass-lands, without being burnt small, and dispersed over the surface; as, wherever that is the case, the sward in the places becomes tender, and the grass comes up coarse and in tufts, which are not eaten by cattle flock, and of course much injury sustained.

In respect to the prevention of the rising of ant-hills on grass-lands, they may be in a great measure, if not wholly, guarded against, by having recourse to frequent heavy rolling; as in the rolling down of ant-hills, instead of cutting them up, in an experiment made by the Duke of Grafton, it was found to be attended with complete success, on a large pasture which had been very much infested with ants, and which they had almost covered with hills. But in such cases the rollings should be performed both in the autumn and spring seasons, when the lands are in such states of moisture as just to admit the impression of the roller without receiving injury from the feet of the horses; as, where such operations are executed when the grounds are in a state of considerable dryness, the benefits are comparatively small. The beneficial effects that are produced in this way depend much upon the degree of conflagination that is effected; as it is only by this means that the insects can be prevented from carrying on their operations; a certain flame of lightness as well as flashed in the mould being essential to the execution of their labours in a perfect manner. But besides these attempts have been made in other ways to prevent the formation of these hills. For as it has been seen that "the economy of the ant requires the situation and soil to be dry, light, and friable, in order to carry on their works, it is probable that, in lands that will admit of the practice, it may be an easy and convenient method of destroying them, and preventing the bad consequences which their labours produce on the surface sward, to conduct water over them; and thus, at the same time, exterminate the colonies of ants, and irritate the ground; by which two improvements may be effected at once,—the land being cleared from ant-hills, while its fertility is considerably increased." And the use of night-soil, in combination with various sorts of earthy matters, has been advised with the intention of destroying such insects; but this is probably a practice that can only be depended upon in slight cases. See Ant-hill.

Upon still yellow clays, a Hertfordshire farmer has found the practice of draining, according to the Effex mode of carrying off the surface-water, useful, though this practice is totally unsafe by his neighbours in the same parish. Experience has convinced him, that drefling a cold tenacious clay not previously drained is an absurd waste of time, money, labour, and every thing most valuable. Having obtained a tolerably dry surface, his next object (with meadow-land) is to deepen the staple of the soil, and this he does by every kind of compost carried on it for two or three years together, which he finds establishes a better sort of grass than drefling once in three years on the surface.

It is suggested that the culture of feeding the first year, instead of mowing, is a practice that must be preferable or most according to the nature of the soil, and the object of converting it into grass-land. With respect to the former, he has found, that if he was to allow even the tendering of sheep the first year after the grass-feed is sown, he should fill the surface with receptacles for water, and should have very little, if any, grass of a coarse quality, notwithstanding his drains, because the sheep or cattle would press the clay so close, that the water could not penetrate into them; whereas, if he shuts up his field, suffering the grass to stand till it theds the feeds, he finds the following reason that he is enabled, by giving only a flight drefling, to cut a good crop of hay from it. And in cases of old worn out thin patches or moisy grass-lands, the practice of scarifying or cutting the surface sward, in different directions, by implements for the purpose, has been lately advised as very beneficial in promoting their improvement, especially where they are afterwards manured, and have suitable gras-feeding fowl over the thin or patchy parts, as in this way the grass-plants become more strong and vigorous. In performing this business Mr. Amos has adopted the use of a machine for scarifying and drefling grass-land, whether it is to be mown or depuffled with animals. And he conceives that the bell time of performing this operation, is from the middle of February to the middle of April. And that, in general, drefling the land one way is sufficient; but, if the sward be very moisy or adhesive, it should, be thinks, be drefled length and crofs ways, cleaned, and then rolled, the cutters of the implement being occasionally cleaned from the rubbish. It is also suggested, that if the sward be thin, it may be thickened very much by laying eight or ten tons of rotten dung upon it, and fowing seven pounds of white clover, four pounds of wild or cow-clover, four pounds of trefoil, four pounds of rib-gras, and one peck of bell rye-gras seeds, per acre, previous to its being drefled or bath-harrowed, and then cleaned and rolled. It is supposed that by drefling land in this way, mofs is torn up, ant and mole hills levelled and destroyed, the roots of the grass cut and horfe-hoed, which causes them to throw out fifth lateral shoots or floets, the sward thickened, and the surface made so clean as to put on the appearance of a perpetual spring when clofe fed down. And that, by such management, and grazing as much lock as will keep the gras in a young succulent state, and labbbing or mowing all the tufts and weeds three times in the course of the summer, the grazier will be enabled to receive every benefit from his land, and likewise
GRASS.

Statement of Expense.

<table>
<thead>
<tr>
<th>Description</th>
<th>2s. 10d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A team of five horses, 30 loads a day, and wear</td>
<td>0 12 6</td>
</tr>
<tr>
<td>and tear</td>
<td>- - - -</td>
</tr>
<tr>
<td>Driver</td>
<td>- - - -</td>
</tr>
<tr>
<td>Filling, at 2d.</td>
<td>- - - -</td>
</tr>
</tbody>
</table>

In 1822 this method answered very greatly: the meads were then not capable of irrigation, but one meadow had since been watered, and the water has taken much greater effect on account of the funding, than if that operation had not been performed. The land has all been laid on the most boggy meadows. This hint should not escape the notice of the practical farmer in other districts, as there are many where it may be had recourse to, with the greatest advantage and success. There is likewise a similar method of improving old rough and boggy meadow-land described, with a plate, by a writer, under the title of Agricola Norfolkensis, in the first volume of the Fervet of the Agricultural Magazine, as practised by Mr. Rix, of the same county:—

"This meadow was situated at Clifton, near Fakenham, in the occupation of the above, and the property of T. W. Coke, esq," of Holkham. It is noticed that this meadow, from the neglect of former tenants, and want of judgment in cutting what few open drains or ditches were attempted, had become very wooded in many places, and at least three parts of the four so over-run with hedge and bushes, that its utmost annual value could scarcely be estimated at more than eight shillings per acre. The lands contiguous to it are of a light friable nature, inclining to sand, by spots, and fall with a gentle declivity towards it from each side; the meadow being the basin and receiver of the numerous springs which rise in the upper fields, and which, in course of time, had rendered some parts of it utterly impassable for an horse, and fearfully safe for a man at certain leasons. It is observed that the first repe the present occupier took was, as soon after Michaelmas as he could, to cut the drains, as he has shewn in the plan; all of which are provided, except the main drain, and forty of the ditches. These latter are cut both wide and deep, and are the chief outlet drains to the springs above. And as soon as the weather permitted, he next set the teams to work (which were enabled to enter, even upon the most unfound parts, very shortly after the first process was concluded), to level the hills, fill up the hollows, and to cart all the superfluous mould he could collect within the boundary of the meadow, (such as came out of the new-cut ditches and main drain principally), to the amount of 1000 loads, over the surface of the whole. About the last week of March he drilled; and where the roller could not work, from little inequalities of ground, he dibbled the feeds mentioned in the annexed statement, harrowing the small feeds in afterwards; and, in July last, he cut and stacked the produce, which the writer has seen, and can witness to be excellent hay. It is added that the present appearance of the meadow, after being fed down very close by more than fifteen score of sheep, exhibits, notwithstanding the very wet season we experienced, one uniformly dry, firm, and smooth surface, completely covered with a short turf, confiding of ray-gras, Dutch-clover, and good natural grasses. There are certainly some rushes yet, but far less numerous and strong than heretofore, and which it may justly be expected a few sweepings with the sythe, and hard l flocking with sheep, will in time wholly destroy. But though there may not be much

And it is likewise observed, that "Mr. Bevan's tractable land at Riddlesworth, joining to his low boggy meadows, gave him the power of carting sand down hill at an early expense; and thus he improved some parts of those meadows to great effect; from 100 to 150 loads an acre were spread at the expence of 4l. or 5l."
much novelty in the scheme of draining, the writer is of opinion, that very great merit is due to Mr. Salter, for the introduction of vetches, which he apprehends was never before tried on pasture-grounds, or indeed on any ground whatever unbroken by the plough. It certainly answers several admirable purposes, one is, that it gives a prospect every year of a bulky crop of hay, which otherwise must have been very scanty. And being sown with oats, the vetches afford that hovering kind of shade and protection to the young gramineae in which they most delight. The eddih is of course also worth more.

But he is not a little sure, whether Mr. Salter's experiment gave rise to the following practice, which, he is informed daily gains ground. Where the clover plants fall partially, or by spots, on a new layer, spring vetches are often drill-rolled upon the surface, not ploughed. The few clover-plants are thus left to grow with the vetches, and both together, in due season, form nearly as good a sward, as if the clover had not died away. Mr. Rix is so thoroughly convinced of the utility and advantage of the method he has pursued, that he is now preparing a second meadow, lying at the foot of the one just improved, for a similar process of improvement.

In cases where pasture-land can be spared for mowing, Mr. Rix seems to be of opinion, that vetches may be profitably employed, even a second year, upon new improved meadows. He has had some experience of such a repeated trial, and the writer believes he thinks favourable of it. He dibbles the feed upon the unbroken surface, after feeding it down as close as he can with sheep or other stock.

I t is stated that the above meadow of Mr. Rix's cannot be over-rated, if it be said that it is, at this moment, more worth thirty shillings per acre to a tenant, than, in its former state, it was eight shillings the acre.

"Debtor and Creditor Accounts of Mr. Rix's Meadow, ending at Michaelmas."

<table>
<thead>
<tr>
<th></th>
<th>£</th>
<th>s</th>
<th>d</th>
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</thead>
<tbody>
<tr>
<td>363 of open drains, at 9s.</td>
<td>14</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>175 under grains, at 6d.</td>
<td>9</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>700 under faggots, laid in drains</td>
<td>5</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Filling and spreading 1000 loads of mould, at</td>
<td>25s. per hundred</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seed.</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 co. fp. tares</td>
<td>6</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>6 bushels of grey peas</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>4 do. of oats</td>
<td>0</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>2 do. of ray-graves</td>
<td>1</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>100 pounds of Dutch clover</td>
<td>5</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Dibbling</td>
<td>1</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

Horsey's Time.

<table>
<thead>
<tr>
<th></th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 horses 14 days, setting about mould</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4 do. drill-rolling, 3 days</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>2 do. bedilling and rolling in feeds, 3 days</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
</tbody>
</table>

Men's Time.

<table>
<thead>
<tr>
<th></th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 man driving team, 14 days</td>
<td>1</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>2 men drill-rolling, 3 days</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>1 man bedilling, 2 days</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>do. gathering bones, 2 days</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Total expense | 65 | 7 | 0

It is also necessary that care be taken to keep grass-lands in a proper state of production, by the judicious use of top-dressing, and by observing suitable methods of mowing and feeding them down by flock, and it becomes of course requisite in the view of keeping such lands in the most proper condition for the production of plentiful crops, as well as that of altering and improving the nature of the herbage, to have recourse to the occasional application of manures; as by this means the slope and depth of the vegetable mould are not only much increased, but the land brought into such a state of fertility, as it may afterwards be kept up with much less expense and trouble than before.

A late writer has stated, that "it is a circumstance well known to graziers in the belt cultivated districts, that when lands of this sort are suffered to get much out of condition, it is a much more difficult business to restore them to the proper state of productiveness, than to preserve them in it. From the constant decomposition and decay of various vegetable materials on the surface of grass-lands, new portions of vegetable mould are constantly added, that improve the quality of the lands, and at the same time afford a more suitable and fertile bed for the establishment of the different kinds of grass-lands. It is chiefly, perhaps, on these accounts that old grass-lands are superior to new ones, and it explains the reason of the greater utility of earthy composts, with dung in the latter than the former cases. However, with respect to the nature of the materials being made in such circumstances, there is much difference of opinion; but it should, probably, be regulated by circumstances; such as the rate of the land in regard to dryness, its situation, the heat of the season, and its nature and condition in respect to soil and fertility. Where the land is such as not to admit the dung-cart in the early spring-months, without the danger of injuring the surface by poaching on breaking the texture of the sward, the most proper period would seem to be in the beginning of the autumn, before the heavy rains fall; at this period the draughting may be laid on with the greatest convenience and safety; and from the after-grasses being chiefly confounded with the least loss in that particular. It is, however, recommended to be performed by some immediately after the land has been mown and cleared from the hay, in which method there may be an advantage in some cases, as the growth of the after-grasses may thereby be rendered more abundant." But, in other respects, it has been observed by the author of Practical Agriculture, that, "it must often be not only inconvenient, but un economical, as from its happening at a season when much other business is to be performed, it can seldom be attended to in such a manner as is necessary; and when the season at this period is hot, and there is much sun, as is generally the case, there must be considerable loss sustained in the evaporation and diffipation of the finer and more enriching particles, such as become more immediately the food of plants, from their being in a condition nearly suitable for being absorbed and taken up by the roots of the grasses. The extent of the loss incurred in this way is much more considerable than is commonly supposed, as much appear evident from the great evaporation and constant evaporation that is often kept up for many days, or even weeks.
weeks, as the very offensive smell that issues from Profes.
In this district, where we have occasionally witnissed the practice, with some of the less intelligent farmers, the moisture of the manure has been so much forced off and dissipated, especially when there is much wind, as to leave the materials apparently a perfectly dry flate. The sudden drying up of large ponds, at such feasons, shews in a more striking manner the extent of the injury that the farmer sustains in choosing this season for the application of his manure upon his grass-lands. And, it still further states, that "there is another way in which a vast loss of manure may take place when applied at either of the periods that have been just noticed, especially where the lands lie in sloping directions, as is frequently the case, which is by the heavy rains in the autumnal feason carrying down the more fine and rich parts of the manure, in a state of solution, into the ditches and runlets on the fides or other parts of the fields. Of the great waste of manure occasioned in this way any one may convince himself, by attending to the flate of the water as it drains off from the higher grounds into these places, after the land has been previouly dried, as it will be found highly coloured, and loaded with the enriching carbonaceous particles of the manure." And "after frosts, when sudden thaws occur, the fame thing happens," in a still more extensive degree than in the other fases.

In fases where the natural dryness and open texture of the soil admit of the manure being applied in the early spring months, there will be less danger of waste in the above manner, and at the fame time greater advantage obtained in the growth of the produce; as, from the moderate heat and quickness of the vegetation at this period, the grass will soon over-shade and conceal the dung, where laid on in a suitable state of reduction or fineness, without suffering much exhalation to take place; and the enriching material be conveyed to the roots of the grafs-plants at the time in which it may be the moft useful in promoting their growth. Where the principal object of the farmer is a large produce, and the nature of the foil will admit of the manure's being applied without injury, this is unquestionably the most fuitable as well as moft beneficial time of putting the dung upon grafs-lands. The eafier, however, it can be performed the better. See Manure.

But it has been flatled by fome, that manure produces the strongest effects upon the land when applied early in the autumn, or in meadows as soon as possible after they have had the hay taken off from them. And others suppose this last as the moft proper fason for laying the bullfines performed in of any.

In regard to the kinds of manure that are most proper, there is scarcely any fort that will not be beneficial when laid upon grafs-lands; in general, however, the more rich animal kinds will be the moft fuitable for the older forts of fward-land; and dung, in combination with fresh earthly materials, the more proper on the new lays or grafs-lands, as by this means a fine early bed will be prepared for the roots of the grafs-plants to shoot and freqoad themselves into, and a better fward formed in confequence of such applications. See Layering Land down to Grass.

It is the practice of the fett farmers in the hay-diétricfs of Middlesex to ufe the richest dung they can procure, without mixing it with any fort of curdy material, as they find it anowver boil in the quantity of produce, which is the principal object. The lands on which this fystem is pursued, are mostly such as have been long under fward, and where the soils are chiefly of the more tenacious, loamy, or clayey kinds. It cannot, however, be doubted, but that earthly compoifs in the proportion of a third or fourth of such materials may, in many fases, according to the nature and circumftances of the land, be had recourse to with great and beneficial effects, both in rendering the land more productive, and in bringing the herbage into a finer flate, as well as in bettering the surface for the purpofe of mowing. See Manure.

It may be obferved, that whatever the nature of the material may be that is employed in combination with dung, or the fort of manure that is ufed, it fhould invariably be brought into a rather fine flate. It is the practice, in the diftricts mentioned above, to turn over the dung that is brought from London in a flate of tolerable rottennesfs once, chopping it well down in the operation, fo as to be in a middling flate of fneness when put upon the land. It is neceufary, however, that it fhould be in a more rotten and reduced flate when applied in the spring, than when the autumn is the time of putting it upon the land.

In refpect to the proportion of manure made ufe of at one time, it fhould be, in order to be dealt, in a tolerable flate of cultivation, but, in general, fuch as to afford a good even covering to the surface of the ground. Where the manure is of a very good and enriching quality, the quantity may be from four or five to fix orfew loads on the acre, of fuch as are drawn by three or four horses. But where the manure is of an inferior quality, a much larger proportion may be requisite and proper.

The frequency of dressing grafs-lands, in fo far as it respects the foil, fhould confantly be performed at fuch diftances of time, as that the fertility of the lands may not be suffered to decline, but be preferred in an equal or increafed flate of heart; in which the manner and frequency of cutting, or otherwife confuming the produce, muft be confidered; as, where crops are more frequently taken off, the land muft be prevented from being injured, by the great fofs of fertility that must arise in this way, by the dressings being applied at shorter intervals, or in larger quantities at a time; but the fhirf is by much the bell method, as injury may often be done by too great a dressing being given at once. But, in general, where fuch lands are in a tolerable flate of cultivation, every third year may be fufficient; while on fuch as are of inferior value, it may be a better practice to do it every second year, as by this frequent application of manure, the lands may attain a gradual improvement; whereas, in the contrary cafe, they would be on the decline, and in time become poor and worn out to the great injury of the farmer. It is too common practice, in diftricts where grafs-husuandry is imperfectly understood, to almost wholly neglect the manuring of fward-lands, in order to employ it on thofe which are under the plough; but this is obviously bad management; as it is only by the raifing of full crops of grafs for being converted into hay, and of proper kinds of green food, that a full flock of cattle can be kept, and the largest poftible proportions of manure provided for the land. It may be noted there are a few articles made ufe of as top-dressings to grafs-lands, which cannot, it is faid, be frequently repeated with either safety or advantage, fuch as chalk, marle, chopped woollen rags, and some others. It is flatled, that "the lin of these kinds, especially when of a soft, uncohesive nature, fo as to readily fall down in the flate of solution to the roots of the grafs-plants, is found to produce the moft benefical effects, in rendering the lands more fertile and productive, and improving the quality of the herbage. It cannot, however, be often repeated in its fimple flate with advantage, as it is some time in producing its full effects; but in that of compoifs, it may be applied with succefs at shorter intervals. Marle is likewise a fubftance, especially when it is of the rich, foapy kind,
GRASS.

kind, that may be made use of with much advantage as a top-dressing on grass-lands; but as its operation is slow, it cannot be repeated at short intervals, except when employed in the state of a compost with dung-woollen rags, which, rendered small by being chopped into pieces, may be laid on land in the state of fward; but as they require a considerable length of time to sink down and become mixed with the foil, so as to be well covered by the grass, they cannot be repeated at short intervals. After they have been fully incorporated with the land, their beneficial effects are considerable, as have been fully shown in the trials of different grass-farmers; and there are various other matters that are occasionally applied as top-dressings on grass-lands; such as lime in combination with rich vegetable earth or peat, the ashes derived from the combustion of peaty substances, coal-silks, malt, dust, and foot. Most of these have been made use of with good effects when thinly spread out over the surface of lands in the state of grass. The three last have been found to produce the best effects in being dispersed over the new layers of the artificial grass kinds. All applications of this sort should be applied in February, being spread over the surface as evenly as possible. "If it can be done before a shower of rain, it will be the better, as it is of advantage to have them carried down to the roots of the grasses as soon as possible after they are laid upon the land." But some advise, in the management of purchased manures, that experiments should be formed for a year or two, before the practice is extended, to see which, at a given price, will suit the land best. Without this precaution, a farmer may probably expend large sums of money to little purpose. Nor should it be trusted to the mere appearance of the effect soon after the manuring; for some of them, particularly foot and mud-dust, will stay themselves after the first heavy showers, in a finer green than the rest of the field; but the proof of the effect does not arise from fine greens, but from weight of hay; for it has been found from experience, that the latter is not always an attendant on the former. Contiguous half-acres, or roods, should be marked out, the prices of the manures calculated, and on each piece a separate one spread, all to the amount of 20s. an acre, for instance. At hay-time, the crops should be weighed. It will then be known which manure, at the given prices, suits the foil best. This knowledge will prove true experience, and a very different guide from general ideas.

And here is still another circumstance necessary to be attended to in putting manure upon lands of this kind, which is not to suffer too much to be placed out in any of the heaps, but to have them set out as much as possible in moderate fixed portions, and "at regular distances from heap to heap; as, where the contrary is the case, it not only takes up more time, and causes much more trouble to the labourer in spreading them, but does not admit of the work being performed in so regular or so exact a manner. Besides, when the heaps are set out too large, much injury is done to the grazips-plants on the surface where they flood, if not from spread out, which should always be the case, in the quickest manner."

It is also of much consequence, in the execution of this business, to have convenient carts for the purpose, which, in general, are those of the single-horse kind. Some care is likewise necessary in the scaling or spreading-out all sorts of top-dressings on grass-lands, to see that the work be performed in an exact and even manner, and that all the clods and lumps be well broken down and perfectly reduced by beating with the fork or floovel. If possible, a dry season should be chosen for this sort of business, as, under such circumstances, it can be executed in the most regular and exact manner; as when the weather is wet, it is an operation that can never be well performed, as the materials clog up the feet and implements of the workman, and can never be effectually separated or divided so as to be spread out with the necessary degree of evenness."

It has been already noticed, that after the heaps have been set out, they should not be suffered to remain so long, as is often the case, before they are spread out, as the plants underneath them become blanched and tender, and great injury is done to the sward in such cafes, all of which may be easily avoided by spreading as soon as possible after the manure is taken out. Inconveniences of this kind may likewise be avoided by spreading the manure from the carts, as is the practice in the midland and some other districts; but in this method it is suspected the work can neither be executed in so exact a manner, or with so much economy of time or labour. In this way hill-reads will not be formed, and, of course, the disadvantage of their getting too large a proportion of the manure prevented; as Mr. Marshall has well observed in his Economy of the Midland Counties of the Kingdom.

The usual practice, as soon as "the whole has been spread out, and remained in that state for a fortnight or three weeks, or longer, according to circumstances, and is become in some degree dry and powdery, to apply a bulr-harrow over the surface once or twice in a place, in order to reduce the manure into a finer state, and bring it more fully to the roots of the grasses. But this sort of work, as that of spreading, should never be attempted when the season is wet, and the manure in a sandy, adherent state. As soon as this work has been executed, all the rubbish of every kind should be carefully picked off, in order that the ground may receive the action of the roller," which should be passed over it as frequently as may be thought necessary, when the land is in a suitable condition for receiving it. (See Rolling.) This is the principal business which is requisite in the management of grass-lands in general.

In Hertfordshire, "a mode of managing found meadows and pastures has lately been tried, and attended with great increase of produce. The grass is mown as soon as it is in blossom, and, consequently previous to the formation of seed. The after-grass is not grazed until it begins to contract a yellow appearance, in the latter end of October or the beginning of November. In this case the ground remains covered during the winter with a portion of dead herbage, through which the young grass springs with the greatest vigour. Mr. Knight contends, that the sap in all plants ascends through the abundant vessels of the root, and is diffused over the leaf, whence it is returned to form new roots and buds, and to prepare them for vegetation. According to this theory, if the leaves be eaten off on moving ground, as soon as they are reproduced, the roots are deprived of their nutriment, and the plants in consequence vegetate weakly in the succeeding spring. Whether this hypothesis be well or ill founded, it is certain that the ground which is left with this portion of the leaves of grass in the one season, is much more productive, and more early in the next; and close grazing will ever be found to decrease the quantity, although it should improve the quality, of the following crops." It is evident that there is some truth in this, from its having been found that the crops are more early and abundant in different cafes, where the after-grass is not fed down much in the autumnal season with live stock. See MOWING AND GRAZING.

Cooperative Quantity of Food from Grass and Tillage Land.

With respect to the difference in the proportion of human food raised from grass and tillage land, the first circumstance necessary to be attended to, according to a late writer, is that commonly...
GRASS.

However, in the cheese counties, the products vary a good deal: in Cheshire 4 cwt. per cow; in Shropshire 2½ cwt.; in Gloucestershire about 2½ cwt.; in Wilts 4 cwt.; in Somersetshire 3¼ cwt. The average of all these is 3½ cwt. and at three acres per cow, 1 cwt. and a small fraction per acre; and as these counties are richer than those applied to the produce of butter, meal may be constituted 1½ lbs. and pork 20 lbs.; in all £4.7s. per acre, or thereabouts. But as to meat, authorities are not very ample: in the midland counties there is a very general notion, that an acre of grass, at 42s. rent, will give 200 lbs. of mutton. By an experiment made on land of an inferior quality, which is mentioned in the Annals of Agriculture, land of 16s. rent, gave 80 lbs.; and he has heard, on good authority, that in Cambridgeshire some observations, carefully made, confirmed this proportion of produce in land fed both with bullocks and sheep; and the produce of beef, &c., in the Lincolnshire marshes, goes even further than this ratio or proportion to the acre.

With respect to the butter dairies, they are on land of about 16s. an acre rent; and if the produce be 97 lbs., the proportion will be 68 lbs. to every shilling rent. The cheese dairies, at 25½ rent, yielding 145 lbs. are also at about 68 lbs. per shilling rent. The meat is 58 lbs. per shilling. It is easy then to decide, that dairy counties are more advantageous than grazing ones in weight of produce; but their superiority is far greater in another point of view; their produce comes much more into the consumption of the poor; for, where one poor person eats meat, there are probably forty that consume butter and cheese. How to compare these products with those of arable land is very difficult; and yet the inquiry is too interesting entirely to be omitted: a long train of investigation might enable one to difentangle difficulties, but it would require much time to go deeply into such a variety of subjects. The produce of a good loamy soil, under the course, 1. Turnips. 2. Barley. 3. Clover. 4. Wheat, may, it is supposed, be calculated in this manner.

No. 1. Arable dry Land at 16s. an Acre Rent, Five Acres each Crop; twenty Acres in all, in a Course of four Years' Husbandry.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Time</th>
<th>Persons</th>
<th>Weeks</th>
<th>Per acre</th>
<th>Per week</th>
</tr>
</thead>
</table>
| Turnips | 1 & 5 | 2 | 1 | 8 months | 4 lbs. | 100 lbs. | 200 lbs.
| Barley and oats | 6 months | 2 | 6 | 4 months | 1 lb. | 60 lbs. | 120 lbs.
| Clover | 7 months | 2 | 7 | 6 months | 1 lb. | 75 lbs. | 150 lbs.

In practice, the produce at these rates would vary according to the quality of the land and the management of the farm.

In the above accounts, the produce of each acre is calculated to maintain a family of five persons.
GRASS.

The same land, if in grazfs, would give 80lbs. of mutton per acre, 400lbs. per annum, and for four years 1600lbs. sufficient at 3lb. a day to support eight persons one year and thirty-six days.

Hence, "to make the deduction, before alluded to, of the farmer's family, and his labourers; supposed he farms an hundred acres, which is, probably, above the average size of farms of the kingdom, here are five persons to that extent, or one to twenty acres. If we reckon all forts of labour at 21lbs. an acre, we shall, he supposed, not be far from the fact: the pay of a labourer may be reckoned on an average at 2s. which we shall call the food of five persons; setting the earnings of the wife and children against rent, clothes, and other articles; this makes food 5s. a head; for every 5s. therefore that the farmer pays in labour, we may safely, he supposed, reckon that one person is fed from the produce of his farm before it reaches the market: the labour in the twenty acres in the above inferred climate being 21lbs. he calls four persons', and the farmer's family, making five, to be deducted from the acreable amount of the farm."
GRASS.

But if the barley and oats be brought into the account 
26 human food, the account will then stand in this way.

<table>
<thead>
<tr>
<th></th>
<th>Perons.</th>
<th>Years.</th>
<th>Weeks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>12</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Oats</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Barley</td>
<td>15</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Deduct for farmer and labour | 6 | 1 | 2 |

Remain | 26 | 1 | 2 |

It is consequently stated, that in one case, the grass has the advantage as fifteen to six; in the other, the arable as twenty-six to fifteen.

**No. 111. Poor Soil or Heath — Rent 5s.; five Acres each Crop; thirty Acres in all.**

1. Turnips; four sheep an acre, to the increase of 6s. each, or 24s.; in mutton 48lbs.; and for five acres 240lbs.; sufficient, at 4l. per diem, for one person one year sixteen weeks and four days.

2. Barley and oats; one horse to thirty acres, which demands 2 1/2 acres of oats, at three quarters (feed deducted); the remainder therefore 2 1/2 acres for barley, at 25 quarters per acre, being sixteen bushels (feed deducted), and for 2 1/2 acres forty bushels remain for malt; but enough in bread, at nine bushels a head for 3 1/2 persons a year, minus one bushel.


4. Ditto.

5. Ditto.

The whole, without any horse account, would feed, 1 1/2 years, three sheep per acre, 26 weeks.

2. Two ditto ditto to the improvement (or the value in keeping) of 40s., and for five acres in each to 10s.; hence it appears that to keep one horse would almost equal the whole amount.

6. Rye: 1 1/4 quarter; twelve bushels; feed deducted, ten; sufficient to support one person fifteen months; and for five acres six persons one year and eight weeks.

Within a small fraction equal to

The same land in wheat would feed, but not fitton, to the value of 10s. per acre; call this 20lbs. of mutton; 120lbs. for five acres, and 60lbs. in six years; sufficient, at 4lb. per person, for three persons a year and thirty-six days.

Brought forward, arable account — 8 1 0

Deduct, as farms on this soil are large, only half a person for thirty acres for the farmer; and reckoning labour at 8s. an acre, it is 12l. for thirty acres, or 21 persons; in all three — 3 1 0

Remain for market — 5 1 0

Grass for ditto — 3 1 5

Consequently the arable is therefore superior as nearly three to one. Upon the whole of these comparisons it is sufficiently clear, that the arable land is, and in every case may be, (by eating barley and oats,) far superior to grassland in the article of feeding not only the people at large, but also in feeding a surplus to market. He cannot, however, let his papers go from his hands without requiring them to be read with candour. He prefers to offer them as rough sketches, that may approximate to truth, but cannot reach exactness; they may afford hints useful to future inquirers, and the subject is interesting enough to answer well a very careful examination. One observation that goes generally to all is too material to be omitted; the production of meat in England is, it is supposed, of small importance compared with that of corn, because the poor do not live on the farmer; meat is the consumption, generally speaking, of those who are in very easy circumstances, compared with the great consumers of corn; nor would the times be much complained of, whatever the price of meat might be, provided corn were at a reasonable price. This is a circumstance which should be considered as decisive of the inquiry; and sufficient to prove, that the great interests of the public demand every possible encouragement to tillage so given, as shall prefer corn at a fair price, neither too high for the poor, nor too low as to discourage the cultivation of it by the farmer.

With regard to what ought to be the proportion between the grass and arable land of a farm, errors are, it is observed, extremely common among landlords, and not left to with farmers; in general, however, they both look to their own interest; the land to keep much in grass, and the latter to plough all they can: with short hanks, and bad covenants, we are not to be surprised at either. One acre of moderate corn, says Adam Smith, in his Wealth of Nations, yields a greater net profit than an acre of the best pasture. And experience, Mr. Davis of Longleat observes, sufficiently evinces the extreme difficulty of persuading tenants to believe that they get more, generally speaking, by feeding their lands than by ploughing them; yet it requires
very few arguments to convince a landlord, that is cold wet lands especially, the less ploughed land you have, the less you put it in a tenant’s power to ruin your estate. That a tenant of 60s instead of 40s, per annum in a dairy-farm will get money, while a corn-farm will marve its occupier (though, perhaps, the former gives 15s an acre for his land, and the other but 10s), is felt-evident. Perhaps, says Mr. Billingley, in the third volume of the Bath Memoirs, there cannot be a stronger proof of the inferiority of the plough, with respect to profit, than the superior punctuality of the dairy-farmer in the payment of his rent. He never met with the reward of a manor devoted partly to corn and partly to dairy-farms, who controverted this statement.

Grass.—Upon this soil, with tenancies and not easily drained, a larger portion should, it is observed, be kept in grass than perhaps on any other; and for this reason,—green winter food is not to be gained at all, or, if gained, not without great difficulty and expense; consequently, the team, and whatever cattle may be kept for continuing draw and making dung, must depend in a larger measure on meadow hay, than upon fields which admit turnips, cabbage, &c. Clover will do on clay, but it is more hazardous and liable to failure; in which case, without a certain recourse in the hay of natural grass, the farmer would often find great inconveniences. He has examined many farms with this object in view, and found that, when half the land has been grass, they have been more profitably conducted than with a less proportion; but on no account with less than one-third.

Lamb.—It is stated that “one-third or one-fourth in grass is a proportion found suitable to various loams; the more they tend to wetness, the larger the portion. It is not, however, essential on these soils, not only because clover and other artificial grasses are less apt to fail; but likewise by reason of their admitting profitably the alternate husbandry of grass and arable.”

Sand.—It is contended “that some rich lands are of so happy a texture, that they do very well in permanent grass, and without burning in flight droughts; but, in general, it may be observed, that land in its several varieties is, of all other soils, that which pays best in tillage; it is easily worked; expences are light; it manures itself by agreeing well with sheep; and, as the result of the whole, farmers are usually rich upon it. In respect of the proportion, it is best managed, perhaps, when the whole is under the plough; for, by means of cultivated grasses of proper sorts, all the rock of the farm may be profitably supported, and the land reaped sufficiently, for ensuring a perpetual production of corn. But, contrary to this maxim, and most unprofitably, large tracts are commonly tied up from the plough, by covenants of leaves, under the name of sheep-walk, henth, &c., which would, by alternate tillage and red, produce more corn, and keep more sheep; than in the present state; this is particularly the case in Norfolk, Suffolk, Nottinghamshire, and some other counties.”

Chalk and Limestone Soils.—“Nearly the same observation is to be made on this clays; they are more productive under the plough than in grass. But landlords tie up their tenants from ploughing down in Sussex, Hampshire, Dorsetshire, and Wiltshire; but in Gloucestershire, the East Riding of Yorkshire, and Lincolnshire, they have, on the whole, been less tenacious; still, however, large tracts remain, which would be ploughed were tillage permitted. Rules may be carried too far, and this among the rest. Dorsetshire has its own leaves, which, in many cases, ought not to be touched; and fine fowet downs, which by very attentive management have been brought to a considerable degree of fertility, are so useful to sheep in winter, that exceptions must occur. Another motive for ploughing is the peculiar advantage derived on this soil from its formation, one of the most useful grasses that we owe to the bounty of Providence, but attainable only by tillage.”

Peat.—Imenous regions of moors spread widely through all the northern counties, and even in the most southern, as Devonshire and Somersetshire, Cambridgeshire and Wales; also fedgy bottoms are found every where. They admit and call for a much greater improvement than any other soil, comprehending the larger part of the waste lands of the kingdom. These soils are very rarely brought into the flate they are capable of, without tillage, and consequently, to prohibit it, is to pass a decree of perpetual fertility. The obstacle, however, most common on moors is, the rights of commonage, which do not come within the scope of the present inquiries. When improved, they are commonly much more adapted to grazes than to tillage, not however without numerous exceptions, as we fee by the general practice in the farms of Cambridgeshire and Lincolnshire. The alternate husbandry does well upon them; it is safe, however, to be too busy with the plough; for, when good grass is gained, it is the wiser way to continue it in a productive state. But it is further stated, that the subject of the proportion between grasses and arable requires a word or two, viewed in another light, besides the relation to soil. This is the prevalent application of the land. In the midland counties, where grazing very widely extends, it is common to fee entire farms of grass—land, and the tenant prohibited from breaking up an acre; in such cases there is a motive for ploughing not immediately connected with soil. To till a part would be right, whatever the soil may be; it varies in such a country not to be hasty, and the convenience and profit of having some is no inconvenient object; it would be carefully used as litter, and the manure arising would improve a portion of the land. Some cabbages, or Swedish turnip, or common turnip, might be raised (which to a certain extent, and for certain objects on such farms, would be highly valuable to the grazier), to so as to outweigh large expenses in procuring them on soils not quite adapted to their culture. There is not a question but a farmer in such cases could afford to pay more rent for liberty to plough a portion of his land than under the present covenants. This would, it is supposed, extend to a fourth of the farms in soil rather unfavourable to the plough; and to a large proportion in others. But even three or four small fields, though no more than one-fifth, one-sixth, or one-tenth, would be highly advantageous to himself and the public, and not at all injurious to the landlord or owner. And to dairy-farms, when entirely in grass, as many are in Wiltshire, Gloucestershire, and other counties, this remark is yet more applicable, as the produce of tillage, byre, or maize, &c. is yet more necessary than in a more fattening system. In this case, and indeed in most others, the quantity might be partly regulated by the tenant; a dairy-farmer, who keeps four horses to draw his butter or cheese to fairs, &c. ought, without question, to have tillage enough to employ those horses; and it is no difficult matter to ascertain that quantity. If the various works be examined carefully, it will be found, that a horse to twenty acres of tillage is a fair proportion, which will leave time for carting hay in summer, and the products of the farm in winter. He is not speaking here of tillage farms on sands, &c. or with rotations of crops, in which the soil reds for several years, on such the proportion varies; but merely on grass farms, where some horses must be kept, and are at present
unemployed a large part of the year. But meadow farms, properly so called, are never, to his knowledge, met with but in the vicinity of great cities, where the demand for hay is great and uniform; horses on such are kept only for the purpose of carrying hay to market, bringing dung back, carting the hay to the stack, and the manure to the fields. Straw is wanting for litter and for thatch; but it is questionable whether it is profitable to plough for this object only in any case; a scattering of tillage is in some places found, but not by any certain rule; the necessity is small, and straw usually to be purchased. Such different, being highly improved, demand very little attention, it is supposed. See This. See Rotation of Crops, and Pasture.

Grass-Leafs, in Agriculture, a term frequently applied to such ward lands as are appropriated to the purposes of grazing, or the fattening of neat cattle and sheep.

Grass-Seeds, a term often used to signify the several different feeds of grasses that are employed in laying down land to the flate of turf. It was, however, formerly, mostly made use of to denote the mixture of all sorts of rubbish that was scraped up from the hay lofts, or collected in the cribs or boxes below the racks in the stables. But in the improved method of forming new grass lands, the practice of using such mixtures of feeds is almost wholly laid aside, and only such as are really useful and proper, had recourse to, by which the lands are found to be much more valuable and productive. See Laying Lands down to Grass.

Grass-Field, in Rural Economy, a name applied to such fods or turfs as are parred off from the surface of old stward lands, whether they be intended for the purpose of burning on the land, for fuel, or for being laid down in order to form a lawn, or even spot of fine even turf. In the former intentions they are generally pared off by ploughing, or spades, contrived for the purpose; but in the litter almos constant with great regularity and exactness, by a turf spade for the purpose. A tool of the plough kind feems, however, capable of being employed in this way also with advantage. See the next article.

Grass-Cutting Plough, the name of a tool of the plough kind, which was invented on the continent by count Van Mattzen, and which has been highly useful in cutting grass-fods in a cheap and expeditious manner. It can also be hired recourse to with great advantage in paring the twards off old grass lands, walls, and commons, previously to their being burnt and brought into the flate of tillage-hubandtry. It is likewise capable of being converted to the purpose of forming walks in grounds where they may be wanted, as well as in paring the bottoms and sides of them, and of such as have been already made, by which means the gardener will only have the simple busineses of raking and rolling them to perform.

By some slight alterations in the manner of placing the coulters, grass-fods are likewise capable of being cut in a very ready manner, and in any form that may be required, so as to be employed in the construction of banks, fortifications, dunes, and other works of a similar kind. It would seem, consequently, to be a very useful tool in the expensive busineses of constructing embankments against the sea, or other large waters.

The inventor was led to the construction of this plough, in conquence of the want of a more cheap and expeditious method of performing the work than the usual one of the spade, in cutting turf for forming grass-plats, &c.

It may be observed that in forming the tool, the beam, or fore part of any common plough will answer the purpose; this part is consequently not reprepresented in the figure, the hind or operative parts being simply flown. The tool is capable of being managed by any person who is able to direct a common plough.

This plough may be seen at fig. 7, in the Plate on Grassing, in which the nine holes shown by A, A, in the beam, serve, as in the common plough, to regulate the length of the beam merely by placing the pin C forwards or backwards, and thereby to make the cutting-iron to work to greater or less depth. The two coulters, E, E, which are placed on each side of it, in front of the cutting-iron D, serve to guide the sde cut, preparatory to the separation of the turf or clods. The cutting-iron D may, by means of the screws G, G, be raised or lowered at discretion. And, in order to keep it in its place properly, the two supports H, are made, and provided with several holes for the purpose at I, formed in the cutting-iron D. The two handles are displayed at 

A certain degree of practical experience is necessary, in order to use this plough, for to form the turfs with exactness; and in the commencement of the work care should be particularly taken that the workman does not cut the turfs too deep, and that the plough be not injured by his inattention. In a very short time, he will, however, become accustomed to the business as to perform with great exactness. In setting out the work, a breadth equal to the width of the two cutters should be previously cut out, as by that means the cutting-iron takes the sde at proper depth, and executes the work, as soon as the draught commences, in the manner of the performance of the work, and are recommended as preferable to horfes, from their drawing more steadily, and being more readily managed on stiff lands; but we apprehend that this will not, in general, be found to hold good, and horse-teams are far more expeditions. See Team.

Grass, in Mining, signifies the natural surface of the earth over a mine; sometimes also it is called the "day," or the top; and a mineral vein appearing on the surface, is said to come, or appear to grass, or to the day. Coals and other stratiified minerals, when they come to the surface, are said to beafet, crop, hurl-out, go-out, want-cover, to run-out, to out-hurl, to head-out, to run-out, &c.

Grass River, in Geography, a river of America, in the N.W. part of the state of New York, which rises near the main branch of Black river, and runs N.N.W. about 50 miles, then N.E. 40 miles, and is lost in the river St. Lawrence. N. lat. 45° 12'; W. long. 74° 49'. It is a rapid river, affords many small-rafts, and near the mouth, its banks produce great quantities of hay.

Grasse, a town of France, and principal place of a diociph, in the department of the Var. The place contains 12,571, and the canton 13,554 inhabitants, on a territory of 100 kilometres, in four communes. The principal trade of the town consists in dry fruit, olives, oil, perfumes, and tanned leather —9 miles W.N.W. of Antibes. N. lat. 43° 39'. E. long. 6° 59'.

Grasse, Lyr; a town of France, in the department of the Aude, and chief place of a canton, in the district of Carcassonne; 20 miles S.W. of Narbonne. The place contains 1123, and the canton 4544 inhabitants, on a territory of 2023 kilometres, in 18 communes. N. lat. 43° 5'. E. long. 2° 42'.

Grasses, Petrified. Mr. Whitehall, in his "Inquiry concerning the Earth," vol. ii. p. 169, mentions grasses among the vegetable remains in the coal-measures of Derbyshire: but the late Mr. William Martin, who was perhaps better acquainted with these strata, says, "Outline," p. 85, that
that the graminis of these orchilaceous flarae are of unknown species in the recent flate, and appear rather allied to the canes and reeds of the Indies, than to grases properly so called. Mr. Farey also, in his laborious researches among these carboniferous flarae, has seen nothing refembling grases imbedded in them. See REEDS.

In peat districts, which are of modern or recent accumulation, and within the range of flooded rivers, it is not uncommon to meet with preferred grases, probably belonging to many of the recent species, at considerable depths below the surface of, or even at the bottom of the peat, or muddy deposits; but such peat foilles should on all occasions be distinguished carefully from stratified, or real foilles remains, as remarked in our article Coal.

**GRASSHOPPER, in Entomology, a species of Gryllus;** which fee.

**GRASSHOPPER, in Ornithology, a name given to the Alula tricolor;** which fee.

GRASSI, Cecilia, in Biography, afterwards Mrs. Bach, who performed the first woman's part for several succeeding years at the opera with Guisardi and Guadagni, was inanimate on the stage, and far from beautiful in her person; but there was a truth of intonation, with a plaintive sweetness of voice, and innocence of expression, that gave great pleasure to all hearers who did not expect or want to be surprised. Her performance of the part of Euridice, in Gluck's "Orfeo," with Guadagni, was perfect in all respects, and gave universal satisfaction.

GRASSWINKEL, Theodore, a learned lawyer and writer, who flourished in the 17th century, was a native of Delft. He wrote various works upon legal and political subjects, by which he acquired a considerable reputation, and was regarded by the government as a proper person to fill some office in the State; he was accordingly made a member of the Chamber of Holland, and secretary of the bapitist chamber upon the part of the State. He died in 1666, at Mechlin, and was buried in the great church at the Hague. His works were numerous; of these the following may be noticed, "Libertas Veneta, seu Venetorum in se et suis imperandis Juris." This was published in 1634, and in 1641, he defended the republic of Venice, in a dispute with the Duke of Savoy concerning precedence. For these services, that republic created him a knight of St. Mark. Previously to the publication of the last of the two above-mentioned works, he attempted to confute the popular maxims of Buchan, in a treatise, entitled "De Jure Majestatis." This was dedicated to Christina, Queen of Sweden, who was known to be a great affector of regal privileges. Grasswinkel defended the liberty of the seas against a native of Genoa, in his work "Maris Liberi Vindiciæ." He was author, likewise, of a treatise in two volumes 4to. "On the Sovereignty of the States of Holland." He was at all times a defender of particular states; but a violent oppressor of the rights of the people. Morel. Barke.

**GRATAROLUS, William, was born at Bergamo, in Italy, in the year 1510.** He was educated at Padua, where he took the degree of doctor of physic, and afterwards became professor of the same science, and gained considerable distinction. But having embraced the Calvinist doctrines, on the persuasion of Peter Vermilli, he fled from Italy, through fear of the inquisition, and retired to Marburg, where he taught medicine for a year. But he was compelled to leave that place also, and repaired to Bâle, in the hope of a better fortune, and where, in fact, he taught and practised his profession with success, until May 1562, when he died, at the age of 52. He was author of a great number of works, some of which are honourable to his talents, and evince a large share of knowledge; but in others he shews an attachment to the absurdities of the alchemists, much superflition, and opinions which do not imply a sound judgment. Eloy. Dict. Hist.

**GRATCHE, in Geography, a town of Ruffia, in the country of the Cossacks; 20 miles N.W. of Tzaritsen.**

**GRATIAN, in Biography, a Roman emperor, son of Valentinian I.** He was born at Sirmium, in 359. He was appointed by his father to a share in the empire when he was but eight years old. He was in his seventeenth year when Valentinian died. At this time Gratian was keeping his court at Treves, and was ignorant of what had happened till he was informed that the officers of the army had appointed as his partner in the throne Valentinian II. the younger son of the late emperor, by his second wife Juliana. Gratian, though hurt at the assumption of authority on the part of the army, readily ratified the election, and even treated his brother with affection and tenderness. The Western empire was nominally divided between them, but the superior age of Gratian gave him all the power. One of his first acts was to recall his mother to court, who had been divorced and banished; and this act of justice was followed by the punishment of certain officers in the state, who had abused their power, by cruelty and injustice. While the emperor was praised for these deeds, he has not escaped blame, and a high degree of censure, for putting to death the renowned general Theodosius, who fell a victim to the jealousy of some rival courtiers. History has also censured him for the indulgence which he afforded to the clergy, and for his severity against those who were denominated heretics, for the gratification of the orthodox. At the head of the Eastern empire was his uncle Valens, who was in 378 attacked by the Goths. Gratian, active and courageous, put himself at the head of an army, and marched to his assistance. He obtained a decisive victory in Alcane, and, pursuing his successes, crossed the Rhine, and penetrated into the heart of the enemy's country, in order to join the forces of Valens. Before, however, he could reach him, that emperor had been defeated and slain at the battle of Adrianople. Gratian now felt that he must take the most vigorous measures against their common enemy, and immediately called from his retreat Theodosius, son of the general who had suffered under his hasty displeasure, and placed him at the head of a separate army, with which he was enabled to destroy a large body of Sarmanians, who were on their march to join the Goths. Gratian himself proceeded to Constantinople, where he recalled those orthodox bishops who had been banished by Valens, and he also inflicted some edicts relative to the exercise of religion. As Valens had left no male heir, his nephew, disregarding the suggestions of personal ambition, filled the vacant throne to the satisfaction of all, by raising Theodosius to a station, for which his talents were peculiarly adapted. This was in the year 379, after which Gratian returned to Italy, and in his journey he had an opportunity of being benefited by the instructions of the celebrated Ambrose, at Milan, which proved beneficial to the orthodox, but occasioned new restrictions upon those who were regarded as sectaries. After this he continued for some length of time to attend to the defence and concerns of the empire, and is highly applauded for almost all the amiable qualities which have decorated the life of sovereigns. Still it was feared that his good principles were rather the effect of able and virtuous advisers, than the spontaneous result of fixed habits. What the best friends to their country feared, proved to be the real fact: he suddenly fell into inces of unmanly pleasures, spent much of his time in indolence or
frivolous amusements, which proved not only injurious to his subjects, but, in the end, ruinous to himself. Hunting became his favourite pastime: to enjoy the pursuits of the chase, he neglected the duties incumbent upon him, as the sovereign of a great people, and those only became his favourites who were skilful in hunting. He offended the more sober part of his subjects, by appearing in the garb of a Scythian warrior, armed with a bow and quivers, and drenched in the very point of emulating themselves into a furious shape, when a revolt took place among the legions of Britain, who, without hesitation, invested Maximus with the imperial diadem. Gratian attempted an opposition; but his own efforts were feeble, and these even counteracted by the treachery of some of his officers. He had no sooner unfurled his banners, and put himself in a warlike posture, than he was defeated by his handful troops. He had now no hope, and immediately fled with about 300 faithful troops towards the Alps. All the cities on his road manifested evident signs of disloyalty; they even refused him a shelter or admission into their towns, till he arrived at Lyons. Here, indeed, the gates were opened for his reception, but the hearts of the people were estranged to his cause, and upon the arrival of the cavalry of Maximus, the governor of the city betrayed the deposed emperor into the hands of the commander, who caused him to be put to death, as he rose from his supper. This was in the year 383, after Gratian had been on the throne nearly eight years. Gibbon. Univer. Hist.

Gratian, a Benedictine monk, who flourished in the twelfth century, was a native of Chiusi, in Tuscany, and embraced the monastic life at Bologna. Before his time, there had been many collections of canons and laws of the church, but they were so defective in matter and form, that they could not be conveniently explained, or even made use of as fylkemes of ecclesiastical policy. Gratian undertook the task of compiling such a system, and after more than twenty years' labour he produced, in 1151, an abridgment of canon law, drawn from the letters of the pontiffs, the decrees of the councils, and the writings of the ancient doctors, which he entitled "Concordantia Discordantium Canonum," or as it has been translated, "The Coalition of jarring Canons." In a new edition of this work, it was called "Decretum Gratiani," or "Gratian's Decretal." By this name it is generally known. Upon the first appearance of the work, it received the laud of approbation from pope Eugenius III., who declared himself so satisfied with its execution, that he commanded it to be publicly read in the schools. The professors of Bologna were the first who unanimously adopted it as a text-book in their public lectures, and their example was soon followed by the professors of Paris, and, in short, by those of almost all the European colleges. It is, however, said to be full of errors, and in other respects extremely defective, but as it was calculated to support depotism, and to extend the authority of the Roman pontiffs, it was for four centuries appealed to as the standard of ecclesiastical law, and even in ages preceding that dark period, it has occasionally been quoted with a degree of veneration and authority, to which it has no just title. It was used in MS. till 1570, when it was printed at Mentz; this edition was followed by imitations at Venice in 1576, and Paris in 1580. Another edition was printed at Rome under the auspices of pope Gregory XIII. in four vols. fol., on which a large portion of labour was bestowed in correcting its numerous imperfections. Anthony Auguflin, archbishop of Tarragona, in Spain, published a valuable treatise, "De Emendatione Gratiani," of which the best edition is that published at Paris in 1673.

Morn. Gen.

Gratification, a term some writers use for the dividing a draught or design into squares, in order to the reducing it thereby.

Gratins, in a Ship, are small ledges of sawed plank, framed one into another like a lattice or prison grate, lying on the upper deck, between the main-mast and fore-mast, serving for a defence in a close fight, and also for the coolness, light, and convenience of the ship's company.

Gratiola, in Botany, the diminutive of gratia, a grace or favour, the herb to which it is applied having been called, by the earlier botanical or medical writers among the moderns, Gratia Dei, the favour of God, because of its eminent virtues, which however are of a violent and cathartic nature. It is one of the plants which have been conjectured to yield the tincture called Aqua Medicinalis, so famous at present as a cure for fits of the gout; but this opinion, it seems, is contradicted by the proprietor of the secret. —Linn. Gen. 17. Schelch. 17. Willd. Sp. Pl. v. 132. Willd. Enum. v. 1. 88. Mart. Mill Dict. v. 2. Ait. Hort. Kew. ed. 2. v. 1. 42. Brown. Nov. Holl. v. 1. 457. Jaff. 121. Lamarck. Illust. t. 16. Gaertn. t. 53.—Cliffs and order, Diandria Monogynia. Nat. Ord. Perisoneae, Linn. Scrophulariae, Jaff.

Gen. Ch. 1. Col. Porianth inferior, in five deep, awl-shaped or ovate, upright, permanent segments. Cor. of one petal, tubular, unequal; tube longer than the calyx, angular; limb small, in five deep segments, of which the uppermost is broadest, emarginate and reflexed, the rest straight and equal. Stam. Filaments four or five, awl-shaped, shorter than the corolla, the two or three lowermost short and barren, the two uppermost attached to the tube of the corolla; anthers roundish. Pet. German superior, conical; style straight, awl-shaped; stigma with two lips, closed after impregnation. Peric. Capsule ovate, pointed, of two cells and four valves, the partition from the infixed margins at two opposite sides. Seeds numerous, small, flat. Ch. Corolla irregular, reverved. Two lamens bare."—Capsula superfloria, of two cells and four valves. Calyx in five deep segments. Stigma with two lips. Linnicinus's gratiola, in the first edition of Sp. Pl. 18, chiefly depended on the original and primary species, the officinalis, for of the three others there defined, dubia is Caperonia graticoloides of the second edition, and Lindernia pevidoria of his Mantilla 251: virginius, though in his poliation, was made a Gratiola chiefly on Gronovius's authority, and peruviana, though a genuine Gratiola, had then probably never been seen by Linnicinus at all, but was adopted from Peltier. In the second edition G. Monticellia takes place of the dubia, and a wrong East Indian synonym is annexed to virginius, but no further species are added. In the second Mantilla two new ones are described, rotundifolia and hypopappidae, both from the East Indies, so that six species in all are enumerated in Sp. V. V. ed. 14. To these Willdow has added eight more, chiefly East Indian, prudently declining to adopt three unclean ones from Walter's Flora Carolina. Willd has far outshone his predecessors, giving 31 species in all. Unfortunately a great share of these were derived from dried specimes, their genus determined chiefly by habit, and their flowers or fruit not sufficiently investigated. Indeed several of them evidently differ from the original genus in various respects. Mr. R. Brown, a more critical investigator, has greatly reduced the genus in question, though he has described three...
GRA

entirely new species from New Holland. We shall confine
ourselves to an account of such as are certain, with
compunctions remarks on a few of the rest.

106.)—Leaves ovate-lanceolate, serrated, five-ribbed,
smooth, somewhat longer than the flower-stalks.—Native
of moist places in D. mark, Germany, Switzerland, France,
and Greece, flowering in June. The roots are perennial,
rather creeping. Whole herb smooth. Stem annual, wi-
cending or erect, twelve or eighteen inches high, leafy,
round, pale and very fleck, generally single. Leaves nu-
orous, opposite, fiddle, dotted, above an inch long, ovato-
lanceolate, bluish, with many fiddle tooth-like leaves
in the upper part, and five, rarely seven, parallel ribs, of
which the middle one is the most considerable. Segments
none. Flowers pale blue, with an orange tube, hundred-
lessly an inch long, on simple, solitary, axillary stalks,
which are generally about half the length of the leaves,
ofen more, and bear a pair of bracteoles close to the flower,
by some taken for additional parts of the calyx; these are
spreading and a little toothed.—This species, a stranger
to Britain, is the original one, celebrated for its purgative
virtues, whence the French call it Poorman's herb, on
account of its cheapness and efficacy. Indeed its use
requires great caution, and a plentiful administration of warm
water, butter, or oil, at the same time. A serpule of the
dried herb is mentioned as a sufficient dose, but its uncer-
ainty, and its energetic properties, have justly brought this
medicine into disfavour; there being so many more unexpe-
tionable drugs for the same purpose. Its flavour is nau-
feous and intensely bitter.

(G. peruvian; Wall. Carol. 62.)—Leaves ovate, crenate,
airy as well as the stem. Flowers axillary, nearly fiddle.—
Native of moist places in South Carolina, flowering in May.
Stem simple or branched, near a foot high, square, leafy,
very hairy. Leaves ovate, not an inch long, somewhat
heart-shaped and clasping the stem with their bases, bluntish,
with two or three different teeth on each side, fringed, dotted,
and hairy. Flowers nearly fiddle, white, with a pair of
spreading bracts, which are fringed like the calyx.

albo; Peull. Peruv. v. 3. 28. t. 16.)—Leaves ovate oblong,
toothed, downy, obscurely five-ribbed. Flowers axillary,
fiddle.—Native of Peru, Mexico, and the Brazils. The
whole herb is more or less downy. Stem a foot high, un-
iform, softly hairy. Leaves oblong, somewhat ovate,
various in breadth, bluntish, obscurely five-ribbed, the
margin furnished with double teeth. Flowers white, nearly
or quite fiddle, shorter than the leaves, with a pair of brac-
toes very long, and about it equal to the calyx, strongly con-
temning the idea of their being properly calyx-leaves.

4. G. bifolia. Brown n. 1.—Smooth. Leaves ovate,
dotted, obscurely crenate or entire. Flowers fiddle.—
Native of the neighbourhood of Port Jackson, New South
Wales, and of Van Diemen's land.

5. G. palearum. Brown n. 2.—Clothed with glandular
hairs. Leaves lanceolate, toothed. Flowers nearly fiddle.—
Native of Port Jackson, the south coast of New Holland,
and Van Diemen's land.

6. G. denticulata. Brown n. 3.—Clothed with pow-
dery down. Leaves lanceolate, toothed in their forepart,
scarce longer than the flower-stalk.—Native of Port
Jackson.

Mr. Brown announces the existence of a few unpublislled
Vot. XVI.

species, natives of North America, of which we know
nothing further. He mentions the Linnaean G. hypolepis
and rotundifolia as species of Lindenia with two barren
flowers, undoubtedly a variable circumstance in this tribe,
and constituting no generic distinction. G. Morniera is his
Herpestis, and has the appearance of a good genus.

With respect to some other species.

G. bipinnata. Vahl. n. 4. (Digitalis biansfolia paulus-
burgiana; Tour. Int. 165.)—Leaves linear, entire. Flower-
stalks axillary, the length of the leaves.—Native of Port-
tugal. This forms an unquestionable Gratiola, near the
 officinalis, with which it agrees in qualities, but differs in
leaves, and in the flowers not being more than one-third the
size of that species.

G. obtusifolia of Retzuis, Vahl. n. 10, has neither the
habit, calyx, nor bracteoles of this genus.

G. trifila. Wild. n. 9, seems to agree in all these points
with Mr. Brown's Linnaeophila, the Hortenio indica of Lin-
nex.

G. lutea. Vahl. n. 17. (Gentiana curviflora of Linnaeus),
is referred by Mr. Brown to Toronia, a genus lithuerto
not much understood.

G. GRATIOSA. Officinalis. Hildeburgiana, in the Materia
Medica, is a plant to which various medical virtues have
been ascribed. The first account of its cultivation in Britain,
is that given by Turner in 1568, though it is said that the first
botanist who mentioned it was Matthiolus. It has a strong
bitter nauseous taste, with but little or no odour; and its
virtues are extracted more perfectly by aqueous than by
spirritus menstrua. It resembles Digitalis both in the
shape of its flowers, and in its medicinal effects, and hence
has been called Digitalis minimissima. It is certainly a powerful
and active cathartic, and operates more violently as generally
to induce vomiting; and on this account, Chamel thought
it to be a medicine adapted only to the more vigorous and
rebellious stomachs. Many others, however, recommend
it as a safe and useful purgative. But as its effects are
uncertain, it should be administered with the precaution of a
gradual increase of its dose. This plant has been communi-
cated in hydroelectrical cures; and in moderate doses it is said
not only to set as a hydrophone, but also to produce a diuretic
effect; and influences of its good effects in affiles and
anaerac are related by many respectable practical writers.
Gefner and Burgiss found a clew of the powder to be a
sufficient dose, as in this case it frequently excited nausea or
vomiting; others have given it to half a dram, two fer-
uples, a dram, and even more. The extract is said to be
more efficacious than the plant itself, and exhibited in the
dose of half a dram or a dram in dyseferensis, produces the
best effects. Kollesewits informs us, that in the hospitals
at Vienna, three manial patients were perfectly recovered
by its use; and in the most confirmed cases of inflamma-
tion, it effected a complete cure. It usually acted by
increasing the urinary function, or sialiferous discharges.

G. GRATIOSA. In Geography, one of the smallest Canadi
nrlands, N. lat. 29 15'. W. long. 13 17'.—Also, one of the
Amer. islands, about 10 miles long and eight broad.
It takes its name from its beautiful appearance, and fertility
in corn, fruit, pasture, and cattle, with which it supplies
Tercera, and several of the other islands. It is well peopled,
and has a number of villages; and the coast is defended by
forts. The chief place is La Plata. N. lat. 39 2'. W.
long. 27 56'.

GRATITUDE, in Ethics, a virtue disposing the mind
to an inward benevolent and outward acknowledgments of bene-

40
GRA

fits received. This is a virtue in which the Egyptians pretended to excel all the rest of mankind. See Egypt.

GRATUS, in Biography, a Roman poet, a native of Opia, a town of the place of his birth Fulculus, was of contemporary of Virgil. He has been mentioned by Ovid in a single dilithus. The work by which this author is known, and for which he is chiefly a short notice, is entitled "Cynegeticum," or the Art of Hunting with Dogs. It was entirely unknown to the moderns till it was brought to light by Paul Mantius in 1534. This learned editor printed it from a MS. copy brought by Sampiero from France. It is said to be written with a purity and elegance of the Augustan age. The bell edition was that of Lejoie 1659, 4to. with notes. It has been printed in the collection of "Rei Venaticae Scriptores," 1728, and in Mattaire's "Corpus Posthurnum." Gen. Biol.

GRATTAN, in Agriculture, a term applied provincially in some situations to such arable lands as are managed under a commonable rate. But in other places, as in Cornwall, it is regarded as signifying the moving of grasses the first year, after the ground has been manured with len sand; which is an operation that they denominate moving grattan. The stumps of common fields are also frequently called grattans.

GRATZ, or Gravz, in Geography, a town of the duchy of Stiria, on the river Murz; containing several churches and convents, an arsenal, a castle on a rock, and an inn, founded in 1532. In this town is held the assembly of the dates; and in 1784, it was erected into an archbishopric on the supposition of that of Goritz. It is surrounded by walls. The French took it in 1797; 70 miles S.S.W. of Vienna. N. lat. 47 10'. E. long. 15 16'. Also, a town of Sicilia, called also Headz, in the principality of Troppau, situated on the Mor; four miles S. of Troppau. N. lat. 49 47', E. long. 17 52'.

GRAZEN, in Geography, a town of Bohemia, in the circle of Bechin; 37 miles S.S.E. of Bechin. N. lat. 48 47'. E. long. 14 43'.

GRAVA SEA, a town of Naples, in the Basilicate; 15 miles E. of Venus.

GRAVATTEN, a town of Prussia, on the Curilis Neung; 20 miles S. of Memel.

GRAUDENTZ, a town of Prussia, in the palatinate of Culm, on an island near the Niltena; anciently called Gradec; 14 miles N.E. of Culm. N. lat. 53 28'. E. long. 18 28'.

GRAVE, in Grammar, a species of accent opposite to acute. The grave accent is expressed thus (') and shows that the voice is to be depressed, and the syllable over which it is placed pronounced in a low, deep tone.

GRAVE, in Music, is applied to a sound which is in a low or deep tone. The thicker the chord or string, the more grave the tone or note, and the smaller the accent.

Notes are supposed to be the more grave, in proportion as the vibrations of the chord are less quick. See Grave, in Music.

Grave is also an ingredient in the composition of divers terms in history and policy. Thus we say "land-grave, burg-grave, marg-grave, polity;" &c.

The word, in this sense, is formed of the German grafs, signifying content, count; called in the barbarous Latin gravis and graphio.

Grave is also used for a tomb, wherein a person defunct is interred.

Grave, Ital. (pronounced gravatey) an adverb applied to flow movements in the first degree, more quick than adagio, and more slow than largé. In adagio movements, the time is usually counted by quavers, in grave, by crotchetts. Grave, Ital. and groundment, French, not only imply a slow time, but a certain gravity in the execution.

GRAVE, in Geography, a strong town of Brabant, belonging to Holland, situated in a sandy country, on the S. side of the Meuse, 14 miles S.E. of Utrecht. N. lat. 51 40'. E. long. 5° 41'.

GRAVE Creek, a creek on the Ohio in Virginia, 12 miles from Wheeling. N. lat. 39 46'; W. long. 80 55'. Near this creek is a mound of earth, evidently the work of art, called an Indian grave. Although no tradition remains, that the Indians buried their dead in this manner, these mounds, on examination, have been found to contain a chalky substance, supposed to be bones of the human kind.

GRAVE Harmonic, in Music, is a phenomenon thus described by the late Dr. Robinet: "The reinforcements of found, which are called beats, are noises. If any noise whatever be repeated with sufficient frequency, at equal intervals, it becomes a musical note of a certain determinate pitch. If it recur 60 times in a second, it becomes the note C-flat, or the double octave below the middle C of our harpsichord, or the rate of an open pipe eight feet long. Now there is a similar (we may call it the very same) reinforcement produced in every complete cycle. When the two sounds found of the concord intersect the pulse of the other, the two sounds are more uniformly spread; but where they coincide, or almost coincide, the condensation of one undulation combines with that of the other, and there comes on the ear a stronger condensation, and a louder sound. This may be called a noise; and the equal and frequent recurrence of this noise should produce a musical note. If, for instance, C and E are found together; there is this noise at every third pulse of C, and every fifth pulse of E; that is, 80 times in a second. This should produce a note which is a 15th below C and a 17th below E; that is, the double octave below C, which makes 320 vibrations in a second. That is to say, along with the two notes C and E of the concord, and the compound found which we call the concord of the 17th, we should hear a third note FF in the bass. Now this is known to be a fact, and it is the grave harmonic observed by Rameau and Tartini about the year 1754, and verified by all musicians since that time." Mr. John Gough gives the following account of grave harmonics: "Where the two sounds found in concord are vibrations producing them are arranged in cycles, no one of which continues for a longer or shorter time than the rest; and their effect is perceived by the ear, which becomes fatigued of their presence. For when each cycle of a series, separately considered, exceeds the twelfth part of a second, the sense of hearing recognizes each point of division made by the coincidence of the vibrations which separate the contiguous cycles; this circumstance enables the sense to contemplate these periods apart, and comprehend their origin. On the contrary, when the duration of a cycle belonging to a compound series does not exceed the twelfth part of a second, the interval proves too small to be measured by the ear; it therefore escapes notice in a separate rate; for the points of division recur too frequently to be observed. When the auditory organ finds itself in circumstances answering to the preceding description, it has but one method to pursue; which is, to treat these derivative intervals in the same manner it treats all periods, which are found too small for its comprehension; it therefore reduces them to a simple musical sound, corresponding in pitch to a string which vibrates once in the time of each successive cycle. A grave harmonic is on this account always a lower note.
14. Find the number of vibrations made in one second of time by each of the given sounds: which, supposing C as the principal sound, to make two hundred and forty complete vibrations, is obtained, by multiplying this number by the larger term of the ratio of the given sounds to C, and dividing the product by the smaller term of that ratio, if the given sounds be above C, or the reverse if below it.

2d. Having thus obtained the vibrations of the given confonance, divide the larger number of them, by the larger term of the given confonance, and the smaller number by the smaller term, each of which, if the operation be rightly performed, will give the same result, and shew the number of coincidences of the pulses of the two given sounds in one second, and also the vibrations in that same period, of the grave harmonic sought.

3d. Compare the number of vibrations last found with each of the vibrations of the given confonance, and reduce their ratios to the lowest terms, which will then express the intervals or distances of the grave harmonic, below each of the given sounds.

By way of examples of these rules, we subjoin the following table, shewing the grave harmonic, and several other useful particulars, of the principal confonances in the octave, above C as the principal sound.

<table>
<thead>
<tr>
<th>Given Confonances.</th>
<th>Grave Harmonics, or Implied Sounds.</th>
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<tbody>
<tr>
<td>B</td>
<td>1</td>
<td>450</td>
<td>c</td>
<td>31             2^7^5</td>
<td>2^8</td>
<td>XXXII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXXII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXXII</td>
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</tr>
<tr>
<td>B</td>
<td>1</td>
<td>452</td>
<td>e</td>
<td>32             2^7^5</td>
<td>2^8</td>
<td>XVII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
</tr>
<tr>
<td>A</td>
<td>2</td>
<td>420</td>
<td>b</td>
<td>26             2^7^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
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<td>XXIII</td>
<td>3^7^1^5</td>
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<tr>
<td>G</td>
<td>3</td>
<td>384</td>
<td>f</td>
<td>24             2^7^5</td>
<td>2^8</td>
<td>XVII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
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<td>2^8</td>
</tr>
<tr>
<td>F</td>
<td>4</td>
<td>320</td>
<td>g</td>
<td>24             2^7^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
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<tr>
<td>E</td>
<td>5</td>
<td>300</td>
<td>e</td>
<td>24             2^7^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
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<tr>
<td>D</td>
<td>6</td>
<td>288</td>
<td>f</td>
<td>24             2^7^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>270</td>
<td>g</td>
<td>24             2^7^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
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<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
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<tr>
<td>B</td>
<td>8</td>
<td>256</td>
<td>e</td>
<td>24             2^7^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
<td>XXIII</td>
<td>3^7^1^5</td>
<td>2^8</td>
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Note than any of its constituents, seeing the time of a cycle exceeds the greatest vibration that enters into the composition of it. The strength of a grave harmonic is also weak, when compared with the notes composing it, because these sounds form a kind of harmony, in the same manner as the notes of a sonata. The grave harmonic always keep the direction of the ears, so that the position of the head be changed as often as you please, resembling this to be a united sensation of the auditory duct, because it differs from external sounds, in having no fixed direction. The grave harmonics agree with the ringing of the ears in this remarkable particular; which is a strong proof that their immediate cause is seated in the second part of the nature of things, that this cause originates in the mind." Nicholson's Journal, 8vo. vol. iv. p. 2.

We have been thus particular in quoting from two very able writers on the subject of the grave harmonics, or Tartini's founds, in order to shew the foundation of the rules which we shall here give, for determining the grave harmonic of any given perfect confonance, viz.
but in page 350, lays down an inapplicable and false rule for calculating the place of the harmonic, or implied found, as he calls it; viz. "when two different founds are heard together, their combination always either really produces, or coloriously implies, a third found, whose vibrations are equal to the difference of the vibrations of the two founds in the same time." Thus C 240, heard together with G 360, produces 120; which is an octave below C, &c. Now it is observable, that this empirical rule will give the false results as ours above, only in such cases where the least terms of the ratio (in column 3) differs by unity; which is the case in eight of Tartini's examples out of the ten, but not with the VI or the 6th: which, according to Holden's rule, stands thus, 400 - 240 = 160, and \( \frac{240}{160} = \frac{3}{2} \), or the fifth below the key, instead of the X11th (as Dr. Robison and we have calculated it above); also, 384 - 240 = 144, and \( \frac{240}{144} = \frac{5}{3} \), or the octave and fourth, or eleventh, below the upper note, instead of the XXII. It is not a little surprising that Mr. H. should have overlooked these glaring incon- sequencies of his rule, with Tartini's experiments, on which he professes to have grounded it; acknowledging, however, (p. 354) that he is unable to discover any philosophical principles on which these phenomena can be explained, and can come unacquainted with the writings of the two authors, from whence we have extracted as above. We should not perhaps have thus adverted to Mr. Holden's essay, had it not been in other respects a most respectable work, and one through which these errors are likely to be widely disseminated among musicians, and were not the fanciful system of harmony, which he builds solely upon them, calculated to bewildcr still further the musical student, who may happen to have but a slight knowledge of mathematics.

Among the novelties of Mr. Holden's system, he pretends to prove, by means of the implied founds, (calculated by his rule,) that the minor third, \( \frac{2}{3} \), is a "superimposed third," and not the fundamental less third of the scale, which he lays is expressed by the ratio \( \frac{2}{3} \); (though conceived properly, as he lays, p. 571, by the ratio \( \frac{3}{4} \),) on which account we have introduced this comma deficient minor third into our table, and when its harmonic is shown to be \( \frac{2}{3} \), free octave below the upper note of the comma, instead of \( \frac{240}{160} \), or \( \frac{3}{2} \), which expresses \( \frac{2}{3} \) + 6th, or \( \frac{5}{3} \) and twenty first notes below the upper note, as Mr. H.'s rule would have given it; whereas, had he used the true method of affigining the place of the harmonic or implied found, his supposed fundamental less third, (besides proving less agreeable to the ear on trial, p. 354, than \( \frac{3}{4} \),) might have been degraded from the rank of concords, as having an implied found more than three octaves below the lowest of its notes, which is one of the essential properties of concords, according to their new conceptions.

Another result of these false principles in the essay is, the addition of the integer 7 among harmonic ratios (though to the exclusion of \( \frac{5}{3} \), \( \frac{7}{5} \), &c. \( \frac{2}{3} \), \( \frac{2^{\times 7}}{3} \), &c. page 341, and also of page 350; although \( \frac{7}{11} \), \( \frac{15}{19} \), &c. have real places in the false notes of the trumpet, horn, &c.), and the consequent introduction of what the author calls a grave fourth (see that article), in his descending scale, page 316. According to which also, the acute or comma-redundant major fifth \( \frac{3}{5} \), belongs essentially to the scale, instead of the true concord \( \frac{3}{5} \). We trust that we shall have performed an acceptable piece of service to the well-informed to the harmonic science, by pointing out the source of such incongruous stipulations as the above; and hope, that in a future edition of this useful work nearly all which follows page 349 will be expunged, and configned to its merited oblivion.

The grave harmonics found by the rules and table above, are occasioned by the coincidences of the vibrations of perfect concordances, or the beats of Mr. Sauveur, but since the beats of Dr. Robert Smith also, or those made by imperfect concords, when they occur oftener than 12 or 13 in a second, occasion a grave harmonic note to be perceived, and no theorems for calculating such beats, except that of Dr. Smith from the fractions of a comma of temperament, and Mr. Emerson's from the lengths of strings, having to our knowledge been published, we shall here supply that defect in our article Beats, and give theorems for calculating the beats made by imperfect or tempered concords whole vibrations per second are given, viz.

Let N and M be the number of complete vibrations made in one second, by the grave and acute notes respectively, of the tempered concord whose perfect ratio is \( \frac{n}{m} \) (being the least term, in its lowest number), and let \( \beta \) be the number of beats in one second of time.

Then, if the temperament be sharp, \( \beta = \frac{n - m}{N - M} \), the beats required.

Or, if the temperament be flat, \( \beta = \frac{n - m}{N - M} \), the beats required.

Take for example, the 3d in our table above, and we have \( N = 240 \), \( M = 384 \), \( n = 3 \), and \( m = 4 \); and by the second theorem above \( 6 \times 240 - 5 \times 284 = 172 \); the beats in one second: which are, it will be observed, just double the vibrations in column five of the table, and therefore the grave harmonic thus occasioned, is four octaves below the upper note of this comma deficient minor third. The above theorems for beats will be found of like ease application, in almost every instance of musical calculation.

Grave Intervals is a term applied by Mr. Maxwell and several other correct writers, to such consonances as are flattened or lowered by a major Comma (see article) and it is usual with them to distinguish such intervals by the grave accent thus, \( \mathrm{II} ' \), \( \mathrm{III} ' \), \( \mathrm{IV} ' \), \( \mathrm{V} ' \), \( \mathrm{VI} ' \), \&c.; and on the contrary, to apply the acute accent to such as are sharpened or raised a major comma, as \( \mathrm{II} - \), \( \mathrm{III} - \), \&c. and to call such acute intervals or comma redundant intervals, while those as much flattened are called comma deficient intervals. Which, according to Mr. Holden, a miscalculation, applied this term to intervals lowered by what he calls a bearing, whose ratio is \( \frac{240}{160} = \frac{3}{2} = 11 \frac{47}{69} \) + m. See Grave fourth, &c.

Grave fourth, according to Mr. Holden's system lately published, is an interval less than a perfect fourth, by what he calls a bearing (which is \( \frac{240}{160} = 11 \frac{47}{69} \) + m) having the ratio of \( \frac{240}{160} = 1 = \frac{3}{2} + 1 \) m in Mr. Fairey's new notation; its common logarithm is 881906, 8792, its Euler's logarithm or decimal value of the octave is 3923175, and it contains 2185650 major consonances.

Grave proper femitones, is an interval in Mr. Holden's System of Music, whose ratio is \( \frac{240}{160} = \frac{3}{2} = 43.65201 + 4 \) + m; its common logarithm is 9788109, and Euler's logarithm is 9788109, and the number of major consonances 3922754 which it contains.

GRAVEO, in Medicine, a Latin term, derived from grave, heavy, signifies that species of catarrh, which is usually called a cold in the head; and in which, together with a swelling of the naffles, and breathing of the voice, there is a feeling of fulness and weight in the forehead. It is, according to Celsus, nearly synonymous with the ρυγώδες of the Greeks. See Catarrh. Celsus, de Med. lib iv cap. 2.

GRAVEDONA, or GRAVIGNA, in Geography, a town of Italy, in the department of the Lario, on the lake Como; 42 miles N. of Milan.
GRAVEL.

GRAVEL, in Agriculture, a term frequently applied to a well known material of the small stone kind, the sizes of the particles of which vary from those of very small pebbles to cobbles, and sometimes larger. They are often intermixed with other materials, such as sand, clay, loam, flints, pebbles, iron ocre, &c. Hence there are sandy, clayey, loamy, flinty, pebbly, orty, or ferruginous gravels, &c.

GRAVEL, in Gardening, is a small stone subsistance made use of for the purpose of constructing roads, walks and paths. Walks formed of this material are great ornaments to gardens and pleasure-grounds, as well as useful for common walking upon.

The best gravel for these purposes is that which is naturally composed of irregular pebbles and flints, having a moderate proportion of a yellowish or brownish sandy loam, to make it bind, and give colour. It is obtained in fields and commons, in many parts, at from one, to three or four feet under the surface, though not equally good in all parts, in respect to quality and colour, some having a greater or less proportion of pebbles, a larger or smaller proportion of loam, which is more or less sandy or clayey: it is the colour of the loam, or oxvd of iron, principally, which confinutes the beauty of gravel walks; that of a deepish yellow or reddish colour being the most eligible, as when formed into well-laid walks and rolled, it has an exceedingly beautiful and ornamental effect. Where such gravel can be procured within a moderate distance, and easy expense, it is preferable to all others in some parts. Gravel is of an iron-mould colour, or of a dusty brown hue, which may nevertheless be of a proper quality for walks where the colour is disfigured.

Whatever colour the gravel may have, its proper quality for walks is, a due proportion of moderate, light, sandy loam, to make it bind close and firm at all seasons; but not so redundant, or so clayey, as to be clammy and stick to the feet in wet weather, or so sharp and sandy as to become open and loose in dry weather.

In some places, no other gravel is met with but such as is very loose, sandy, or pebbly, and which has scarcely any binding materials amongst it; which kind never of itself binds, but always remains open and loose, being at all times difagreeable to walk upon; this may, however, be mended by a mixture of light sandy loam, where practicable, adding about one load to every two or three of gravel, call- ing them together, and turning them over two or three times, that they may be well blended and incorparated; and this, when formed into a walk, will often bind close, firm, and smooth at all seasons of the year.

In preparing the gravel for walks, it should not by any means be finely screened, as is often the practice: as it is dug out of the pit, it is only necessary to cast it up in a heap, or long ridge, all such large rough pebbles only as roll down being cleared away; as it screened from the fines, it partakes too much of the loam, so as always to stick to the feet at every flail of rain.

In purchasing gravel for walks, it is mostlly from about two to five or six shilling or more per cart-load for three horf's, though the price differs greatly in different parts, and having regard to the nature of the gravel, as well as the goodheuds of it colour.

In respect to the distribution of gravel-walks in pleasure-grounds, for ornament or use, large ones are necessary to proceed parallel to the house, extending each way towards the side districts of the garden and ornamented grounds: according to the former style of gardening, a large walk of this kind was usually extended in a straight line from the front of the habitation along the middle of the pleasure ground, sometimes having grains plate continued on each side, and sometimes spacious borders furnished with curious shrubs and flowers. But in modern designs these middle walks are rarely admitted, especially in spacious grounds, having nothing in front beyond the parallel habitation walk, but an open rural grass lawn, free from all interferences of walks, &c. However, a good walk closely parallel to the house is indispensably necessary, both for ornament and convenience, and from this side-walks should branch off, communicating with the other parts of the pleasure or garden-grounds; one in particular to be extended in a serpentine manner quite round the ground, others leading in the same manner through the interior parts, so as to have dry firm walking at all times to every part of the ground or garden, without coming upon the grails.

The dimensions for gravel-walks must be regulated according to the extent of the grounds or gardens, as from five to twenty feet or more in width; but all principal walks should be at least eight or ten feet wide; and in large grounds or gardens leading directly from the house; they should be ten, fifteen, or twenty feet wide at least. When the houses and gardens are very large, the main walks continuous to the mansion are sometimes made thirty or forty feet wide; the boundaries on each side being sometimes in grass widely extended, and sometimes in borders for flowers and other curious plants, having either narrow verges of grass, or edgings of dwarf box, or thistle, on the sides of the walks.

In forming walks of this sort, they should be first flaked out to the proper width, and then the boundaries formed, each side of equal level, corresponding to the adjacent ground; the cavity of the walk for the reception of the gravel being afterwards made, the whole space being dug out at least twelve inches deep, to allow for a proper depth of gravel, both to prevent weeds coming from the ground below, and worms from calling up the earth; as also to allow of a proper depth for turning the gravel occasionally when the surface becomes foul; the earth dug out to form the cavity of the walk may be used to raise and form the ground on each side, if necessary, which, and the edgings, should always be completed before the gravel is begun to be laid down into the cavity formed for it.

When the cavity has been thus prepared, any hard rubbing materials may be laid in the bottom, several inches thick; such as coarse gravel or ballast, rough stone dust, brick, or other rubbish, which will greatly prevent worms, and help to drain the moisture from the top of the walk in wet weather, and in winter prevent a dry surface: the proper gravel is then to be laid fix or eight inches thick; in laying, raising the middle higher than the sides, in a gradual rounding form; which is not only necessary to throw off the wet, but also to give the walk a more ornamental appearance; the proportion to be observed in this is, for a walk of five or six feet width, an inch and a half of rite in the middle; for one of ten or twelve feet, two and a half inches; and for one of twenty feet, from three to four or five inches; the same proportion being regarded in other walks.

At every turn or shift for as the walk advances in laying, it is proper to tread, rake, and roll the gravel down, as it always rolls more firm and smooth whilst fresh firered; it is also necessary, for fear of rain, especially in loamy gravel; for which reason, more or less should always be laid in one day than can be finished off, except the rough laying. The treading should be performed regularly with the feet prettily close, taking short steps, so as to render every part equally firm, and not to sink in holes made by the feet, in the work of raking and rolling. The raking should be performed regularly lengthways of the walk; and in the finishing
off or smooth raking, a wooden-headed rake without teeth is most eligible, or the back of any common rake; as by any of these, the surface may be rendered more regular and even, without drawing off the requisite proportion of top pebbles, or raking them into holes or heaps; as the art of smooth-raking is to leave all the proper-sized top stones equally dispersed over the surface. As soon as any part is thus laid and raked, it should be well rolled both across and lengthways; and when the whole is laid, a good rolling should be given the whole length, repeating it till the surface is rendered perfectly compact, firm, and smooth; and after the first shower of rain, another good rolling should be given, so as to make it bind like a rock. This method should be practised with all walks made with these materials invariably.

The management afterwards is, occasional weeding, sweeping, and good rolling, once or twice a week, especially in the advanced part of spring, and all summer; and also occasionally in winter, in dry open weather; and when the surface become very foul, or over-run with small weeds or moss, as is often the case, they must be broken up in spring, and turned the surface to the bottom, and the bottom to the top, by which the weeds and moss will not only be buried, but the walks appear as fresh as when new laid. The custom of breaking up gravel-walks in the beginning of winter, and laying them up in rough ridges, to destroy weeds and moss, is not eligible for general practice, or only occasionally, where any walk is exceedingly overrun; it is mortly more advisable to permit all the principal gravel-walks to remain undisturbed, at least till the spring, when, if it appear necessary, the whole may be broken up, regularly turned, and re-laid in a neat manner.

The turning of gravel is a fort of flight digging, the foul surface being turned down, and the fresh up; some have it performed regularly once a year in the spring, in order to preserve the colour. In these cases, the laying, raking, and rolling, are performed the same as in the first contracting the walks.

The rolling should be performed once a week at least in summer, and if two or three times the more beautiful the walks will appear, and it will tend greatly to destroy weeds and moss; it is mortly a rule among gardeners to sweep and roll every Saturday. During the summer, it is of much advantage to give a good rolling after rain, which affords a compact smooth surface, and preserves the walks in good order.

Gravel, in Geology, is a term properly applied to those fabulous soils, or alluvial deposits of gravel, which are found scattered on the surface of the earth, in almost all situations. It is an essential character of gravel, that it shall contain rounded stones extraneous to the place where they are found, otherwise the breccia, rubble, and broken rocks and gravel near the surface, owing to the action of air, water, and frosts, &c. will be confounded with it, as too often has happened, in the descriptions of countries. The earthly and smaller matters found among gravels, vary in different situations, in all degrees from clay to sand; and yet, if such alluvial mixtures contain rounded stones, and fragments with evident marks of attrition on them, they differ, in describing such soils, to be denominated gravel, adding other words to distinguish the nature and quantity of their earthy mixtures: where rounded stones only are found, with little clay among them, as on the f.a. Beach, and in some gravel-pits, such may be denominated very clean gravel; if a small admixture of sand, loam, (a mixture of sand and clay,) or clay, be found among the stones, such may be denominated clean sandy, clean loamy, or clean clayey gravel: where a considerable portion of the mass is sand, loam, or clay, such should be called sandy, loamy, or clayey gravel; and lastly, where the earths greatly predominate, the terms very sandy, very loamy, or very clayey gravel should be used; or in place of these last, in extreme cases, alluvial sand, alluvial loam, or alluvial clay may be subtilized: the last of which terms would apply to the horizontal earthy deposits or meadow foils, by the sides of rivers, the mud of lakes, &c. We have here made use of the term alluvial, in its strict and proper sense, as denoting matters worn, moved, dispersed, mixed, and deposited in water, in distinction from the regular or undisturbed matters of the terrestrial strata; which, though they shew evident marks of having been deposited in a fluid, the perfect homogeneity of each lamina of the strata, and their vast extension, without rude or accidental mixtures, shew that the laws which governed the two kinds of terrestrial deposit, were not less difficult and marked, than are the processes of the precipitation of matters before mechanically mixed and suspended in a fluid, and the crystallization of substances from a medium super-saturated therewith. During the deposition of the strata, all was tranquil and quiet, except the movements of animated beings, which occupied successively the vast subaqueous plains of strata: during the formation and deposition of the gravels, all descriptions, all was violence and confusion, and apparently so continued for a long period of time.

No problem is of more practical and theoretical importance in geology, than whether gravel is any where found under regular and undisturbed strata? Were the decision of this question to be referred to the opinions of writers on geology, mineralogy, &c. there would be little room to doubt, from their description, that such is sometimes, and frequently, the case; but Mr. William Smith, from having devoted great part of twenty years to the accurate discrimination of stratified and alluvial matters, on the principles above, and after examining the results of the deepest and most extensive wells, shafts, mines, quarries, &c. and converging with quarrymen, miners, &c. who collectively have made an almost infinite number of observations, is decidedly of opinion, that no such cafe can be pointed out in England. It is true, that sandy, loamy, and clayey matters occur, with a very few rounded or broken and mixed flinty fragments among them, so that the nicest discriminations are necessary to distinguish such, in some places, from stratified sand, loam, (or natural brick-earth,) or clay; and under great thicknesses of such doubtful matters, beds of rounded and mixed stones are found, sometimes at very considerable depths, but in all such instances, the doubtful character has continued from the very surface downward, to such gravel-beds, and no where are regular strata of stone, clay, or sand found upon even these doubtful matters, when due caution is used in making and extending the observations. It is true also, that there are, in various parts of the British series of strata, siliceous, or grit-flint beds, and rocks, composed of distinct grains of flint, or crystallized quartz, of all sizes, from such as require a glass for viewing them, to others the size of a man's fist; and in several instances, contrary to the more common cafe, of small and sizeable, or uniform grains, which distinguishing most of our grit-stones, there are beds in which grains, as fine as possible, are mixed with the largest mentioned above, and have, in the cliffs and places where these confine bed-foils, or loose blocks of them, are seen exposed, so exactly the appearance, at first sight, of gravel-rock, or indurated sandy gravel, that it is no wonder they should have been to generally clasped with the gravels. These, however,
who, like Mr. Smith, and the writer of this article, will be
at the pains to trace the blocks of coarse flint alluded to,
to their natural bed, and to examine the newly cut, or broken
faces of them, and their beds and accompanying strata, and
of comparing them with the heterogenous mixtures and uncer-
tain and irregular stratification of the real gravel-rocks,
of which there are great tracts in Nottinghamshire, Derby-
shire, Leicestershire, Staffordshire, Cheshire, and others
of the midland counties, in some places of immense thicknefs,
will see abundant cause for distinguishing even the coarfed
and most irregular of our grit-flinted strata, from the super-
fi Совial gravel-rocks above-mentioned, and, indeed, from allu-
val, or water-worn mixtures of any kind. And such ob-
servers will be struck with surprize, that such a regular and
constant law, as seems to have regulated the formation of
grains of files, of all the flaxes mentioned, should not have
been observed and referred to, for explaining the formation of
coarse as well as fine grit-flints, and have guarded against
our confounding them with the water-worn gravels. Accu-
cumulations of gravel are to be distinguished into native and
foreign, according as the pebbles and earth and extraneous
bodies among them, can be referred to known and adja-
cent strata, or confils of flones and earths not elsewhere
found, or but in very diftant countries. For it will be found,
that except on the sea shore, where the waves continually
carry away, and again throw up the flones, which fall from,
or are washed out of the marine clifts, that the gravel of no
spot corresponds with the strata on which it is lodged, and
if in any situations in land this should seem to be the cafe, it
will probably be found, that those strata extend far to the
east or south-east of the place where their alluvial remains
are lodged, and the circumstances appear to be explainable,
on the principle of a general moving of native alluvia from
the south-east quarter towards the north-west quarter, as
It is a remarkable fact, that all the very coarse, and irregular
grit-flone strata, which have been noticed by the writer of
this article in England, precede or occur beneath a series of
carboniferous strata, or coal-measures; the lowest being
found in the first and third grit rocks of the great Darby-
shire demulcent, and the others occur, both above and below
the grey lime rock, which forms the floor and border of
the great South-Wales coal-field (Phil. Trans. 1861), also
the floor and edges of the forest of Dean coal-basin, and
the western edge of the Somerset and Gloucester, or Bath
coal-field, the northern edge of the Newcastle-under-
line, or pottery coal-field, &c. And which fact it seems to be
that Mr. Kirwan alludes to, under the name of semipor-
tolite in some of the cases mentioned pages 237, 293, 300,
307, 312, and 336, of his "Geological Essays": it is plain,
however, that these coarfe grit-flines, under our coals, do
not indicate the near approach of the fundamental rock of
granite, as Mr. Kirwan would have us believe. We cannot
close this article, without again advertimg to the importance
of accurately discriminating the alluvia found on different
parts of every country, and of tracing their connection with
the regular and continuous strata of flone on which they reside,
and from whence they have been torn. Much information
on the alluvia and strata of the midland counties of England
will be found in Mr. Yarce's Report on Derbyshire.

Gravel Rock, signifies a concreted or indurated mass of
fandy Gravel, (fee that article,) and is carefully to be distin-
guished from the coarfe grit-flone strata, which it often
closely resembles.

Gravel, is a term applied to such relics, or
extraneous follies, as are found in a rounded or worn flate, or
lodged among gravel, or alluvial mixtures, the ruins of
abraded and worn flata. See our article Coal, where the
distinctions between this and other classes of extraneous
follos are explained.

Gravel, in Medicine, the popular term for the disorder
occasioned by the formation of small calculi, or sand-like
concretions in the kidneys and bladder. It is the Nephralgia
arumofa of Sauvage; (see his Nofol. Method. Chas VII.
Genus XV. fpec. 2.) and to be distinguished from the
nephralgia calciforma of the same nosology, in which larger
calculi, or flones, are formed and impacted in the kidneys,
ureters, or bladder.

The symptoms which indicate the presence of gravel in
the kidneys, or in the passages from the kidneys to the
bladder, called the ureters, are chiefly a severe pain in the
loins, which is often accompanied by a fense of numbnefs,
extending down the thighs of the side affected, with a re-
traction of the telficle in the male, and with a fickness of the
fomach, often amounting to vomiting. During the passage
of the small calculi through the canal of the ureter, the
diffenion and irritation occasioned by the calculus, es-
pecially if its surface should be rugged and uneven, excite
thefe symptoms in a more or lefs severe degree, or for a
longer or shorter duration, according to its fize and form;
and they suddenly ceafe when it has entered the bladder.
Pain is again excited in the urinary organs, when the cal-
culus either lies over the aperture, or enters the canal of the
urethra, and a pain and difficulty of passing the urine is
excited. Thefe symptoms, attending the transit of a small
flone from the kidney, or its expulsion from the bladder,
constitute what is ufually called a fit of the gravel. The
more common forms of the diffece, however, confift in the
formation of a fort of fandy matter, of a red colour, which
impedes the free passage of the urine, and occafions consider-
able pain in the attempt, as well as an aching pain in the
loins, through the fymphyfis of the kidneys with the bladder.
A white nodous matter is fometimes discharged with the
urine, under both thefe forms of the diffece, probably
from the irritation excited in the secreting vessels, that open
on the internal surface of the bladder: the passage of the
small calculi occasionally causes a laceration of the small
blood-vessels, and bloody urine is therefore discharged.

The little calculi, excited in those cafes, are fometimes of
a bright red colour, and confift, as well as the red sand which
passes with the urine, or is deposited from it, of the uric or
lithic acid in a concrete flate.

The gravel is a diffece chiefly of advanced life. It is
common in gouty habits, in which it often alternates with the
paroxysms of gout. It has been observed, too, that it
defends by hereditary transmission, like that diffece; and
that of the children of gouty parents fonce have been attack-
ed with the gravel, while others have had the gout. It is
a curious fact, also, that the concretion, called chalk-
flones, which are deposited in the joints in the greut, con-
form of the fame fubstance as the gravelly concretions, viz.
the uric acid. It is to be distinguished from the rheumatic
affection of the bones, called lumbago, by the fickness which
attends the one, and which ceafs in the impace of the other.
and retraction of the telficle, as well as by the nodous or
bloody urine, the pain and difficulty of passing it, and the
appearance of the fandy fquadnent in it.

Chemistry has enabled the physician to administer great
relief to the fufferings occasioned by gravel. The discovery,
by chemical experiments, that the fubfance of these calculi
and nodous concretions is an acid, and therefore capa-
bile of folution in or combination with alkaline fubstances,
led to the administration of the alkalis internally, as reme-
dies for the diffece: and, although it has not been found,
that
that the larger stones of the bladder are dissolved or diminished by the action of alkaline medicines, yet the smaller concretions appear to be prevented from forming, and great relief from the pain and irritation, under all the varieties of concretion, is produced by the use of them. Perry's solvant, Mrs. Stephens' medicines, and Clittuck's R-cipt for the stone, are all of the alkaline class. It is probable that these alkaline medicines operate principally on the fluids in the first passages, by neutralizing the acids occasioned by indigestion, rather than by passing in the circulation, and combining with the uric acid in the kidneys or bladder. This would appear, partly from the fact, that the carbonated alkalies are equally or even more beneficial than the pure or caustic alkalies, in relieving the symptoms of stone or gravel; but it is principally proved by a circumstance, recently ascertained by the experiments of Mr. Home and Mr. Brades, that the absorbent earths, especially magnesia, are considerably more efficacious in relieving those symptoms, and in diminishing the quantity of uric acid in the urine, than the alkalies themselves. The magnesia is to be given in moderately large doses, two or three times a day, and if it proves purgative to the bowels, a few drops of the mixture of opium may be added to it. (See Philosoph. Transact. part i. for 1812.)

Were the alkalines used, it would appear that the potatoes are, on the whole, more beneficial in their complaints than the soda: the pure or caustic potatoes may be given freely, beginning with doses of fifteen or twenty drops, and gradually increasing it, well diluted with any thin drink; and it may be continued for a considerable time with perfect safety. But the carbonate of potash is not less useful, and, especially when dissolved in water saturated with carbonic acid gas, it is not disagreeable, and probably more efficacious. The efficacy of these acidulous alkaline waters was at first indeed attributed to the carbonic acid which they contain, and not to the alkali. (See Lord Medical Commentary on Fixed Air, by Dr. Dobson.) The soda water acidulated by the same gas operates in a similar way, and is another agreeable mode of taking these medicines. Lime-water is likewise pollicled of some remedial powers, but is less efficacious than the alkaline water.

All the aqueous liquors operate in some measure, perhaps, upon another principle, that of increasing the quantity of fluids which pass through the urinary organs, and thus of diluting the irritating uric salts, and consequently diminishing the distress which they occasion; and they may likewise operate negatively, by rendering the patient unable to drink the usual quantity of wine or other strong liquors. Other matters, which tend to increase the flow of urine, form to relieve the symptoms of gravel, upon the principle of dilution; especially small doses of the nitrous acid, or spirits asher nitro, of the pharmacopoeia.

When extreme pain is excited, either by the passing of a small concretion along the canal of the ureter or of the urethra, opiates will afford a temporary relief to the sufferings of the patient, and will perhaps aid in relaxing any spasmatic contraction that may take place in these passages, and thus expedite the passage of the calculi. The same object may be promoted by the use of the warm bath, by fomentations to the loins and pubes, and by warm glycerins.

For the modes of relieving the symptoms, connected with the presence of the larger calculi of the bladder, and of extracting these concretions by surgical means, see STONE:—for all Nephritic and Nephrite.

GRAVELVNAS, in Geography, a town on the S.W. coast of the island of Negroponts, on the fertile of the ancient Eretria; 15 miles S. E. of Negroponte.
point in engraving; after which, if a new edge be made by whetting the graver, it will be frequently found very good without any other alteration. Handmaid to the Arts, vol. ii. p. 56.

The other end is fitted into a wooden handle.

Besides engravers, the seal-cutters, lock-smiths, gunsmiths, gold-smiths, armourers, spursriers, &c. likewise make use of gravers.

GRAVEROL, Francis, in Biography, was born at Nîmes in 1635. He was educated for the profession of the law, and practised, as an advocate, in the parliament of Toulouse, and in the prebifdial chamber of Nîmes, and as director and secretary of the academy in the latter place. He was not only well versed in the studies connected with his profession, but deeply read in objects of general literature, and particularly distinguished for his knowledge of medals and inscriptions. In religion he adhered strictly to Calvinistic principles, which impeded his advancement in life, and at length involved him in persecution. To avoid the huf of cruel laws he retired to Orange, but, not thinking himself safe there, he attempted to pafs into Switzerland. In his journey he was apprehended by the officers of the civil power, and thrown into prison in the citadel of Montpellier. He was, after a long confinement, liberated, and died in the year 1694.

His works consist of several differtations on particular medals, and other monuments of antiquity. His "Observations on the Arrets of the Parliament of Toulouse," in 4to, were much eluced. He was well known to all the learned in Europe, and was admitted a member of the Rivcrvat at Padua.

At his death he had in hand some other literary works. Morei.

S'GRAVESAND, William James le, in Biography, was born at Bois-le-Duc in the year 1628. Having recourse to the examples of learned men, especially that of Boyle, he was sent to Leyden to study the civil law, but he soon exhibited a decided taste for philosophical and mathematical studies, which he determined to pursue in preference to the learning of the courts. He produced, when he was only eighteen years old, an excellent "Essay on Perspicacity," which gave him a considerable reputation among the mathematicians of the age in which he flourished. In 1679 he took his doctor's degree, quitted the university, and settled at the Hague, where he practified at the bar, and cultivated an acquaintance with learned men. He joined some other persons in conducting a periodical work, entitled "Le Journal Litteraire," which was continued without interruption from the year 1713 to 1722. S'Gravesand contributed to it the original differtations relating chiefly to geometry and physics. Among the difficulties most worthy of notice, and which were original pieces of his own composition, were the following, "Remarks on the Construction of Pneumatical Engines;" and "An Essay on the Collisio of Bodies," which was attacked by Dr. Clarke and other learned men, on account of its opposing the principles of the Newtonian philosophy. In 1715 the States General sent an embassy to England, to congratulate George I. on his accession to the throne of Great Britain. S'Gravesand was on this occasion appointed secretary to the persons composing this body, and during his stay in London, he became intimately acquainted with Sir Isaac Newton, and was, upon the recommendation of that great man, admitted a member of the Royal Society. Upon his return to Holland, he was appointed professor of mathematics and astronomy at the university at Leyden. He immediately undertook to teach and illustrate the Newtonian philosophy to the students of the university, and in 1734 he had the additional professorship of philosophy conferred upon him.

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So great were his exertions in the several duties of his office, and in preparing for publication his several works on the sciences, that he injured his constitution, and finally sunk under his labours in 1742, when he was only fifty-four years of age. His principal publications were: (1) "Physicae Elementa Mathematicae, Experimentis Confertam," five introductio ad philosophiam Newtonianam, which consists of the author's lectures; (2) "Matheseos Universalis Elementa," containing a syllabus of algebra for the use of students, with a commentary on Newton's Universal Arithmetic; (3) "Philosophiae Newtonianae Institutiones," which is an abridgment of his Elements of Physics; (4) "Introductio ad Philosophiam, Metaphysicam, et Logiam continens." His mathematical and philosophical works, excepting the first article, were collected and published at Amsterdam, in 2 vols. 4to, with an account of the life and writings of the author. The private character of S'Gravesand was highly respectable and amiable: his morals were exemplary, and he was beloved for his generosity, benevolence, and obliging manners. He was consulted by the ministers of the republic on all matters of finance, and he was of great service to them in deciphering and detecting the secret correspondence of their enemies.

GRAVESANDE, in Geography, a town of Holland, distant about four miles from the fea, six miles W.S.W. of Delft.

GRAVESEND, a town in the hundred of Tolting-tou, in the county of Kent, England, consists of several streets, built on a declivity leading to the Thames; and is particularly known in the parish of Milton, which adjoins to that of Gravesend on the south side. The early prosperity of this town received a considerable check in the reign of Richard II., when the French and Spaniards failed up the Thames in a body, burnt and burned many of the houses, and took a great number of the inhabitants prisoners. To alleviate the loss, the king was induced to give the townspeople a legal claim to the water-passage to London, by a grant to the abbey of St. Mary le Gracie. In the tenth of queen Elizabeth the parishes of Gravesend and Milton were incorporated by her letters patent: but the principal charter was granted by Charles I. in the year 1642. The chief officer, who had before this time been called the portrewe, was by this charter constituted mayor; and in him twelve jurors, twenty-four common councilmen, a fenechall or high steward, and other inferior officers, the government of the town is now vested. The liberty of holding two additional weekly markets on Wednesdays and Saturdays, and an annual fair of four days, was also granted at the same time, together with a full confirmation of the exclusive privilege, conferred by king Richard, of conveying passengers and goods by water to the metropolis. In August 1727 the greater part of the town was destroyed by a fire, which commenced in a barn-yard adjoining to the church, and consumed that fabric, with about 120 houses, besides outbuildings, stables, &c. The present church, which is dedicated to St. George, was erected on the old site in the year 1732, under an act of the fourth of George II., which appropriated 5000l. for that purpose, from the duties on coals and culm, levied under the acts of the ninth and tenth of queen Anne, for building fifty new churches in or near London.

Gravefand has been greatly improved since the year 1764, when a new town-hall, having an area beneath the poultry market is kept, was erected by the corporation. In 1767 a new wharf, crane, and wharfage, were made, the expense of keeping which in repair is defrayed by small tolls for cranage and wharfage. The increase of the trade, 4 P. population,
population, and buildings has been particularly rapid since
the middle of the last century. Under the late act, the
number of inhabitants was returned at 24,813, and that of
houses at 4,125; yet these numbers are very incorrect, and the
population can scarcely amount to less than 40,000, nor the
number of houses between 7,000. Most of the inhabi-
tants are engaged in maritime pursuits or employments.

A small manufactury for cables and ropes is carried on here;
and about the year 1780, a yard for ship-building, which
had long been diffused, was hired by a quaker, named Cle-
very, and several men of war and frigates, besides smaller
vessels, have been built here. About eighteen or twenty
smacks find employment in the cod and haddock fishery;
and most of the Dutch turbot vessels lie off this town, and
send their cargoes to the London markets in small boats.

Most of the East and West India trade, and, indeed, of
the outward-bound ships in general, are supplied with live
and dead stock at Gravesend; and also with vegetables;
about eighty acres of ground in the two parishes being cul-
tivated for that purpose, and for supplying the London
markets with asparagus, which is remarkable for its fine
flavour. Gravesend is situated 22 miles E. from Lon-
don. Haifeld's History of Kent, vol i. 800. Beauties
of England and Wales, vol vii.

GRAVINA, a township and village of America, in Long
Island, New York, seven miles from the city, containing
483 inhabitants.

GRAVIMETER. See HYDROMETER.

GRAVINA, Domenico DA, in Biography, who flour-
rished in the fourteenth century, was a native of Gravina,
in the kingdom of Naples. He was by profession a notary,
but in literature an historian. He seems to have taken an
active part in the civil wars which agitated his country at
that period, and on account of the side which he espoused,
he was deprived of all his property, and driven into exile
with his wife and children. He wrote a history of Naples
in the Latin language, and likewise a history of the trans-
actions in that part of Italy during his own times, from 1350
to 1355. A fragment of this work only is in existence,
the beginning and end being lost; it is, however, reckoned
a valuable document for the fidelity of the narration,
and is to be found in Muratori's collection of Italian his-
torians.

GRAVINA, John Vincent, was born in 1664 at Rogiana,
a castle in Calabria. He enjoyed all the advantages of a
very liberal education, and became well versed in the learned
languages; geometry, physics, history, and antiquities.
He also made himself acquainted with the principles of
theology. Having thus attained to a general knowledge
of the learning of the times, he went to Naples to study
the civil and canon law. After this he returned to Rome,
and lived with Paul Coordo of Turin. He was one of
the original founders of the academy of Arcadi, and had
the charge of drawing up their laws in the style of the
Roman tables. He arrogated to himself the merit of hav-
ing devised these laws, a circumstance which involved him
in a quarrel with the other members, particularly with
Creccembini, the founder of the society, to that these two
learned men were for several years at the head of two
factions which divided the body. In 1698, he was nomi-
nated professor of civil law at the college of Sapienza, and,
in five years after, he succeeded to the chair of the canon-
law. His method of instruction was excellent; he avoided
trifling verbal disputes, and mere scholastic speculations,
and entered into the spirit of the laws, illustrating their theory
by observations drawn from ancient writers, and by a cri-
ticism founded on his extensive erudition. This mode of

GRAVING, the art or act of cutting lines, figures,
or other delineations on metals; more properly called
engraving; which see.

GRAVING-dock, or Dry Dock, is a place from which
the water can be let out or pumped, after ships and boats
are floated into it to be cleared or repaired; sometimes, grav-
ing-docks are above the level of the water, and boats are
dropped upon inclined planes into the same. By the sides of tidal
rivers or harbours these are constructed with strong cleve
gates meeting in an angle to shut out the tide; which gates
are furnished with a small sluice or valve for emptying or
filling the dock, when a vessel has entered at high water,
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or is about to leave the dock at such time. See Docks, and CANAL.

GRAVISKOI, in Geography, a fortress of Russia, in the government of Kolivan, on the Irilich; 219 miles S. S. W. of Kolivan. N. lat. 52° 15'. E. long. 73° 14'.

GRAVITAS, Rogers, in the Ancient Muses, was used to signify a sound produced by the remission or filling of the voice. Gravitas differs from immissio, as the effect from the cause.

Gravitas is also used to denote the state of a woman going with child. See PREGNANCY.

Gravitation, the exercise of gravity, or the action which a body exerts on another body by the power of gravity. It is sometimes distinguished from gravity. Thus, Manpertuis takes gravity for that force by which a body would fall to the earth supposed at rest; and gravitation for the same but diminished by the centrifugal force. See figure of the earth. determin. p. 256 of Mr. Mardoch's translation.

It is only gravitation, or gravity thus blended with the centrifugal force, that we can measure by our experiments. However, methods have been found to distinguish what remains of primitive gravity, and what has been destroyed by the centrifugal force.

It is one of the laws of nature, discovered by Sir Isaac Newton, and now received by all philosophers, that every particle of matter in nature gravitates towards every other particle; which law is the hinge on which the whole Newtonian philosophy turns. See Newtonian Philosophy.

What we call gravitation, with respect to the gravitating body, is properly called attraction with respect to the body towards which the other gravitates.

The planets, both primary and secondary, and also the comets, do all gravitate towards the sun, and towards each other; and the sun towards them; and that in proportion to the quantity of matter in each.

The Peripatetics, etc. hold, that bodies only gravitate when out of their natural places, and that gravitation ceases when they are restored to the same, the intention of nature being then fulfilled. The final cause of this faculty, as they maintain, is only to bring elementary bodies to their proper place, where they may rest. But the moderns shew, that bodies exercise gravity even when at rest and in their proper places.

This is particularly shewn of fluids; and it is one of the laws of hydrostatics demonstrated by Mr. Boyle and others, that fluids gravitate in proprio loco, the upper parts preffing on the lower, &c.

For the laws of gravitation of bodies in fluids specifically lighter, or heavier than themselves, see Specific Gravity, Fluid, &c.

Gravitation, Theory of Universal. Newton is very justly considered as the author of this great hypothesis, though several preceding and contemporaneous writers seem to have formed conjectures on the subject that did not differ very widely from the truth. From the time of Kepler it had ever day become more and more evident, that some mechanical cause had a very material influence on the laws of the planetary motions. The problems which the discoveries of that great astronomer left for future ages to solve were these: Why do the planets and satellites describe elliptic orbits, the former round the sun, the latter round their primary planet? Why is the centre of motion in the focus rather than in the centre of the ellipse? Why are equal areas described in equal times about the centre; and what can be the cause of that remarkable law that is found constantly to subsist between the distances of the planets from the sun and the times of their revolution?

Des Cartes first attempted a solution of these difficulties, by supposing a simple mechanical cause. He supposed the existence of a subtle fluid, which, though imperceptible to the senses, was in constant motion round the sun, and that it involved the planets in its powerful agency. This theory, on its first enunciation, does not seem deficient in plausibility, but upon more careful examination, it is found incapable of explaining any one astronomical phenomenon correctly, and indeed the action of such a fluid would produce effects in many cases exactly the reverse of what it was intended to explain. The spirit of rational enquiry that now began to be exerted on all philosophical subjects, rendered this theory of short duration.

Kepler at a much earlier period had formed more correct opinions on this subject than Des Cartes; indeed he seems to have had a very distinct idea of the existence of gravitation, though he never could have been aware of its agency being so extensive, or that it would ever extend in so satisfactory a manner as it has done since his own great discoveries. Gravity, he says, in his "Commentary on Mars," is only a mutual and corporeal affection between similar bodies. Heavy bodies do not tend to the centre of the world, but to that of the round body of which they form a part: and if the earth were not spherical, heavy bodies would not fall towards its centre, but towards different points. This conjecture has been fully verified by theory and observation; the earth appears not to be a perfect sphere, and accordingly a plumb-line does not tend to the exact centre of gravity of the whole earth, but to a point considerably remote from it, as has been explained under Degree, Earth, figure of, &c.

Kepler likewise strongly suspected that the attraction of the moon was the cause of the tides, and that the lunar irregularities arose from the action of the earth and sun. Perhaps, from the earliest times, some indistinct conceptions are to be occasionally traced in different authors concerning the existence of this universal principle.

Fermat, who preceded Kepler, affirmed, that the weight of a body was the sum of the tendencies of all its particles to all the particles of the earth; and Kepler was of opinion that two bodies left alone in free space would approach each other with velocities inversely proportional to their masses or quantities of matter.

A short time previous to the great discovery of Newton, Dr. Hooke made a still nearer approach to the truth. At a meeting of the Royal Society, May 3, 1668, he expressed himself in the following manner: "I will explain a system of the world very different from any yet received, and it is founded on the three following positions:

1. That all the heavenly bodies have not only a gravitation of their parts to their own proper centres, but that they also mutually attract each other within their spheres of action.
2. That all bodies having a simple motion will continue to move in a straight line, unless continually deflected from it by some extraneous force, causing them to describe a circle, an ellipse, or some other curve.
3. That this attraction is so much the greater as the bodies are nearer. As to the proportion in which those forces diminish by an increase of distance, I own I have not yet discovered it, although I have made some experiments to this purpose. I leave this to others who have time and knowledge sufficient for the task."

This is a very precise enunciation of a proper philosophical theory. The phenomenon, the change of motion, is considered
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fidered as the mark and measure of a change of force, and his audience is referred to experience for the nature of this force. He had before exhibited to the society a very pretty experiment contrived to show the nature of this force. A ball, suspended by a long thread from the ceiling, was made to swing round another ball, laid on a table immediately below the point of suspension. When the impulse given to the pendulum was nicely adjusted to its deviation from the perpendicular, it described a perfect circle round the ball on the table; but when the impulse was very great, or very small, it described an ellipse, having the other ball in its centre.

Hooke showed that this was the operation of a deflecting force proportioned to the distance from the other ball. He added, that although this illustrated the planetary motions in some degree, yet it was not suitable to their case: for the planets describe ellipses, having the sun not in their centre but in their focus. Therefore they are not retained by a force proportional to the distance from the sun.

The exalted genius of Newton can suffer no diminution by the enumeration of that above observations, for though the idea of such a principle as gravitation was not suggested first by Newton, yet so very obscure were the notions of even the most enlightened philosophers on this subject, that it had never been successfully applied to the explanation of a single astronomical phenomenon.

So intimately connected is this great discovery with the history of the human mind, that every known circumstance relating to it has been recorded with the greatest care. Dr. Pemberton relates that Newton, in the year 1666, having retired from Cambridge to the country; on account of the plague, was there led to meditate on the probable cause of the planetary motions, and upon the nature of that central force that retained them in their orbits. It then occurred to him that possibly the same force, or some modification of the same force which caused with us a heavy body to descend with a certain velocity to the earth, might likewise retain the moon in her orbit by causing a constant deflection from a rectilinear path. Before, however, this conjecture could be put to the test of calculation, it was necessary that Newton should have formed some conditional hypothesis relative to the modification of the force with respect to the distance.

That any agency emanating from a central point should decrease as the square of the distance from that point increases, is an hypothesis so natural, that we cannot be surprised that Newton should have selected it; but whether or not he had previously tried any other, or whether he had even at this time deduced it from the nature of the planetary orbits, does not now appear. The calculation which it was necessary to institute, we shall give with great minuteness in its proper place; it is therefore only necessary to remark at present, that it requires that the proportion between the radius of the earth and the lunar orbit should be exactly known. When Newton first attempted to verify this hypothesis, the requisite data had not been exactly determined, and a slight discordance between the results of the calculation and the supposable fact, induced him for a time to abandon his hypothesis. This circumstance has, with great propriety, been recorded as a striking instance of the cool and dispassionate frame of mind which this great philosopher possessed; at a moment when he had flattered himself with the hope of having discovered one of the most important secrets of nature.

Some few years afterwards he was again tempted to renew these calculations, as in this interval a degree of the meridian had been measured in France by Picard. This second attempt succeeded. It is related, that towards the end of the calculation he became so much agitated, as to be obliged to request a friend to assist him in finishing it; and certainly a moment of greater importance in philosophy will never be recorded in the annals of science.

The computation which was made by Newton to determine the identity of the force of terrestrial gravity, with that which retains the moon in her orbit, is still a subject of great interest to astronomers, as they now reverse the process; and taking the theory of gravitation as admitted, they deduce from the same computation the distance of the moon from the earth. We shall give it in the words of Leibnitz.

The force which at every instant deflects the moon from the tangent of her orbit, causes it to describe, in one second, a space equal to the vered line of the arc which it describes in that time; since this line is the quantity that the moon at the end of a second deviates from the direction it had at the beginning. This quantity may be determined by the distance of the earth, inferred from the lunar parallax in parts of the terrestrial radius; but to obtain a result independent of the inequalities of the moon, we must take for the mean parallax that part of it which is independent of these inequalities. This part is, according to observation, 52° 54'.9, relatively to the radius drawn from the centre of gravity of the earth, to the parallel, of which the square of the sine of the latitude is equal to 3. We select this parallel because the attraction of the earth, on the points corresponding to its surface, is at the distance of the moon, very nearly equal to the mass of the earth divided by the square of the distance from its centre of gravity. The radius drawn from a point of this parallel to the centre of gravity of the earth is 6369374 metres, from whence it may be computed the force which solicits the moon towards the earth causes it to fall 8.00101727 in one second of time. It will be shown hereafter, that the action of the sun diminishes the lunar gravity; the part. The preceding height must therefore be augmented /4th part, to render it independent of the action of the sun; it then becomes 8.00101201. But in its relative motion round the earth, the moon is solicited by a force equal to the mass of the earth and moon divided by the square of their mutual distance; therefore to obtain the height which the moon would fall through in one second, by the action of the earth alone, the preceding space must be diminished in the ratio of the mass of the earth to the sun, and of the masses of the earth and moon: but by the phenomena of the tides, it appears that the masses of the moon is equal to 1/4 of that of the earth, multiplying therefore this space by 1/4, we have 8.001003000 for the height which the moon falls through in one second by the action of the earth.

Let us now compare this height with that which results from observations made on the pendulum. Under the parallel above-mentioned the length of the pendulum vibrating seconds is equal to 8.65706: but on this parallel the attraction of the earth is less than the force of gravity by 3 of the centrifugal force due to the motion or rotation of the earth at the equator; and this force is 4th part of that of gravity; the preceding space must therefore be augmented 4th part, to get the space due to the action of terrestrial gravity alone, which on this parallel is equal to the mass divided by the square of the terrestrial radius; we shall therefore have 8.66553 for this space. At the distance of the moon it should be diminished in the ratio of the square of the radius of the terrestrial sphere to the square of the distance of the moon: for this purpose it is sufficient to multiply it by the square of the tangent of the lunar parallax, or 56° 55½, this will give 8.00100483 for
for the height which the moon should fall through in one second by the attraction of the earth. This quantity, derived from experiments on the pendulum, differs very little from that which results from direct observation of the lunar parallax; to make them coincide, it is sufficient to diminish the parallax $2\frac{1}{2}$, and to reduce it to $56^\circ 53^\prime 3$. This is the parallax resulting from the theory of gravity, differing only $\frac{1}{2}$, through part from that derived from actual observation, to which La Place thinks it preferable, considering the exactness of the elements from which it is computed. It would be sufficient to diminish a little the masses of the moon to obtain, by this theory of gravity, the same parallax that is given by observation; but all the phenomena of the tides concur in giving this satellite a mass more considerable, and very nearly such as has been used in the above computation. But however that may be, the small difference between the two parallaxes is within the limits of the errors of observation, and of the elements employed in the calculation. It is then certain that the force which retains the moon in its orbit, is the terrestrial gravity diminished in proportion to the square of the distance.

Having thus shown how the nature of the force which retains the moon in its orbit is investigated, it next remains to inquire if the same force of gravity pervades the roll of the solar system. The same great mathematician, above quoted, observes, that "of all the phenomena of the solar system, the elliptic motion of the planets, and of the comets, seems the most proper to conduct us to the general law of the forces by which they are animated."

Observation has shown, that the areas described by the radii vectores of the planets and comets about the sun are proportional to the times. Now we see, in the article Central Forces, that, for this to take place, the force which deflects the path of these bodies from a right line must constantly be directed towards the origin of their radii vectores. The tendency of the planets and comets to the sun is therefore a necessary consequence of the proportionality of these areas to the times in which they are described. To determine the law of this tendency, let us suppose that the planets move in circular orbits, which supposition does not greatly differ from the truth. The squares of their real velocities will then be proportional to the squares of the radii of those orbits, divided by the squares of the times of their revolutions. But, by the law of Kepler, the squares of these times are to each other as the cubes of their radii; the squares of the velocities are therefore as the radii. It has been shown, that the central forces of bodies, moving in circular orbits, are as the squares of the velocities, divided by the radii of the circumferences described; the tendency, therefore, of the planets to the sun, is reciprocally as the squares of the radii of their orbits, supposed circular. This hypothesis, it is true, is not rigorously exact; but the constant relation of the squares of the times to the cubes of the greater axes of their orbits being independent of their eccentricities, it is natural to think it would subsist also in the case of the orbits being circular. Thus, the law of gravity towards the sun, varying reciprocally as the square of the distance, is clearly indicated by this relation: analogies would lead us to suppose that this law, which extends from one planet to another, should subsist equally for the same planet at its different distances from the sun; and its elliptic motion confirms this beyond a doubt. To comprehend this, let us attend to this motion, beginning at the departure from its perihelion. Its velocity is then at its maximum, and its tendency to recede from the sun surpassing its gravity towards it, its radius vector augments, and forms an obtuse angle with the direction of its motion. The force of gravity towards the sun, decomposed according to this direction, continually diminishes the velocity till it arrives at the aphelion; at this point the radius vector becoming perpendicular to the curve, its velocity is a minimum; and its tendency to recede from the sun being less than its gravity towards it, the planet will approach it while describing the second part of its ellipse. In this part, the gravity towards the sun increases its velocity in the same manner as it before decreased it; and the planet will arrive at its perihelion with its primitive velocity, and recommences a new revolution, similar to the first. Now the curve of the ellipse at the aphelion and perihelion being the same, the radii of curvature are the same, and, consequently, the centrifugal forces of these two points are as the squares of the velocities. The vectors described in the same time being equal, the aphelion and perihelion velocities are reciprocally as the corresponding distances of the planet from the sun; the squares of these velocities are therefore reciprocally as the squares of these distances; but at the perihelion and aphelion distances, the centrifugal forces in the osculatory circumferences are evidently equal to the gravity of the planet towards the sun, which is therefore in the inverse proportion to the squares of these distances. Thus the theorems of Huygens on the centrifugal force were sufficient to demonstrate the tendency of the planets towards the sun: for it is highly probable that this law, which extends from one planet to another, and which is verified in the same planet, at its aphelion and perihelion, extends also to every part of the planetary orbits, and at the same time to every distance from the sun. But to establish it in an incontrovertible manner, it was requisite to determine the general expression of the force which, directed towards the focus of an ellipse, would oblige the projectile to describe that curve. And it was Newton who demonstrated that this force was reciprocally as the square of the radius vector. It was essential also to demonstrate rigorously that the force of gravity towards the sun only varies in one planet from the same force in another, according to their different distances from it.

This great geometrical scheme, that this followed necessarily from the law of the squares of the periodic times being reciprocally as the cubes of the distances; supposing therefore all the planets at rest at the same distance from the sun, and abandoned to their gravity towards its centre, would descend from the same height in equal times: this result should also extend to the comets, notwithstanding the greater axes of their orbits are unknown; for we have been in the second book, that the magnitude of the areas described by their radii vectores, supposes the law of the squares of the periodic times proportional to the cubes of their axes.

A general analysis, which embraces every possible result from a given law, shews us that not only an ellipse, but any other conic section, may be described by virtue of the force which retains the planets in their orbits; a comet may therefore move in a hyperbola, but then it would be only once visible, and after its apparition would recede from the limits of the solar system, to approach other funs, which it would again abandon, thus visiting the different systems that are scattered in the immensity of the heavens. It is probable, considering the infinite variety of nature, that such bodies exist. Their apparition should be a very rare occurrence; the comets, we shall observe, are those which, having closed orbits, return, at the end of intervals more or less considerable, into the regions of space that are in the vicinity of the fun. The satellites tend also perpetually to the fun. If the moon was not subject to its action, instead of describing an orbit almost circular round the earth, it would soon abandon...
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don it; and if this satellite, and those of Jupiter, were not solicited towards the sun, according to the same law as the planets, perceptible inequalities would result in their motions which have not been recognized by observation.

The planets, comets, and satellites are therefore subject to the same law of gravity towards the sun. At the same time that the satellites move round their planet, the whole system of the planet and its satellites is carried by a common motion, and retained by the same force, round the sun. Thus the relative motion of the planet and its satellites is nearly the same as if the planet was at rest, and not acted upon by any external force.

We are thus conducted, without the aid of hypothesis, by a necessary consequence of the laws of the celestial motions, to consider the sun as the centre of a force, which, extending infinitely into space, diminishes as the square of the distance increases, and which attracts all bodies that are within the sphere of its activity. Every one of the laws of Kepler discovers a property of this attractive force. The law of the proportionality of the area to the times shows us, that it is constantly directed towards the centre of the sun. The elliptic orbits of the planets show that this force diminishes as the distance increases; finally, the law of the proportionality of the squares of the periodic times to the cubes of the distances demonstrates, that the gravity of all the planets towards the sun is the same at equal distances. This gravity may be called the solar attraction when it is considered as relative to the centre of the sun, towards which it is directed; for without knowing the cause, we may by one of those suppositions, common among geometers, imagine an attractive power residing in the centre of the sun.

The errors to which observations are liable, and the small alterations in the elliptic motions of the planets, leave a little uncertainty in the results deduced from the laws of motion; and it may be doubted if the solar attraction diminishes exactly in the inverse ratio of the square of the distance. But a very small variation in this law would produce a very perceptible difference in the motions of the planetary orbs. The period of the terrestrial orbit would have an annual motion of 1 1/25 if we only increased by one ten thousandth part the power of the distance to which the solar orbit is reciprocally proportional; this motion is only 11.6 according to observation, and of this we shall hereafter see the cause. The law of the square of the distance is then, at least, extremely near, and its extreme simplicity should induce us to adopt it, as long as observations do not compel us to abandon it. At the same time we must not measure the simplicity of the laws of nature by our facility of conception, but when those which appear to us the most simple accord perfectly with observations of the phenomena, we are justified in supposing them rigorously exact.

The gravity of the satellites towards the centre of their planet, is the necessary consequence of the proportionality of the areas described by their radii vectors to the times, and the law of the diminution of this force, according to the square of the distance, is indicated by the ellipticity of their orbits. But this ellipticity is hardly to be perceived in the orbits of the satellites of Jupiter, Saturn, and Uranus, which renders the law of the diminution of the force difficult to ascertain by the motion of any one single satellite; but the constant ratio of the squares of the times of their revolutions to the cubes of their distances, indicates it beyond a doubt, by demonstrating, that from one satellite to another, the gravity towards the planet is reciprocally as the square of the distance from its centre.

This proof is wanting for the earth, it having but one satellite, but it may be supplied from the following considerations:

The force of gravity extends to the summits of the highest mountains, and the small diminution which it there experiences, leaves no doubt but that this force would be perceptible at much greater altitudes. Is it not natural to extend this to the moon, and to suppose that the force which retains it in its orbit, is its gravity towards the earth, in the same manner as the solar gravity retains the planets in their orbits round the sun? for, in fact, these two forces seem to be of the same nature; they both of them penetrate the most intimate parts of matter, animating them with the same velocities; for we have seen that the solar gravity solicits equally all bodies placed at equal distances from the sun, and that the terrestrial gravity also causes all bodies to fall through the same height in equal times.

A heavy body, projected with force horizontally from a great height, falls on the earth at a considerable distance, describing a curve, which is apparently parabolic; it will fall still further, if the force is greater, and supposing it about seven thousand metres in a second, it would not fall to the earth, but would circulate round it like a satellite, setting aside the resistance of the air: for it has been fully shown above, that, to form a moon of this projectile, it must be taken to the height of that body, and there receive the same motion of projection; and the identity of the moon's tendency to the earth, has been already demonstrated, by shewing that to obtain this tendency, it is sufficient to diminish the terrestrial gravity according to the general law of the variation of the attractive force of the celestial bodies; and we have seen, that the law of the diminution of gravity, which in planets, accompanied by several satellites, is proved by a comparison of their periodic times, with their distances, is demonstrated for the moon, by comparing its motion with that of projectiles, at the surface of the earth.

The observations of the pendulum made at the summits of mountains, had already indicated this diminution of the terrestrial gravity; but they were insufficient to discover the law, because of the small height of the most elevated mountains, compared with the radius of the earth: it was requisite to find a body very remote from us, as the moon, to render the law perceptible, and to convince us, that the force of gravity on the earth is only a particular case of a law that pervades the whole universe.

Every phenomenon throws new light on, and confirms the laws of nature. Thus the comparison of experiments on gravity with the lunar motion shews us, that the origin of the distances of the fun and planets, in the calculation of their attractive forces, should be placed in their centres of gravity; for it is evident, that this takes place on the earth, whose attractive force is of the same nature as that of the sun and planets.

The fun, and those planets which are accompanied by satellites, being thus proved to be endowed with an attractive force, varying inversely as the square of the distance, a strong analogy leads us to attribute the same property to the other planets. The spherical figure common to all these bodies, indicates that their particles are united round their centres of gravity by a force which, at equal distances, equally solicits them towards these points; but the following considerations leave no doubt upon this subject.

We have seen, that if the planets and comets were placed at the same distance from the sun, their gravity towards it would be in proportion to their masses: now, it is a general law in nature, that action and re-action are equal and contrary; all these bodies, therefore, re-act on the fun, and attract in proportion to their masses: they are therefore endowed
dowed with an attractive force proportional to their masses, and varying inversely as the square of the distance. By the same principle, the satellites attract the planets and the sun, according to the same law. This attractive property, then, is common to all the celestial bodies; it does not disturb the elliptic motion round the sun, when we confide only their mutual action; for the relative motion of the bodies of a system are not changed by giving them a common velocity; by impressing, therefore, in a contrary direction to the fun and to the planet, the motion of the first of these two bodies, and the action which it experiences on the part of the second, the fun may be considered as immoveable, but the planet will be solicited towards it with a force varying reciprocallly as the square of the distance, and proportional to the fun of the masses; its motion round the sun will therefore be elliptic. And we fee by the same reasoning, that it would be so if the planet and fun were carried through space with a motion common to each of them. It is equally evident that the elliptic motion of a satellite is not disturbed by the motion of translation of its planet, nor would it be by the action of the fun, if it was always exactly the same on the satellite and the planet.

Verthief, the action of the planet on the fun influences the length of its revolution as diminished as the mafs of the planet is more consideral; so that the relation of the square of its periodic time, to the cube of the major axis of its orbit, depends on its mafs. But since this relation is nearly the same for all the planets, their maffles must evidently be very small compared with that of the fun, which is equally free for the satellites with respect to their principal planets.

This we may readily suppute from their smallness.

The attractive property of the heavenly bodies not only belongs to them in a mafs, but to each of their particles. If the fun only acted on the centre of the earth without attracting particularly every one of its particles, oscillations would arise in the ocean, infinitely more considerable and very different from those which we observe. The gravity of the earth to the fun, therefore, is the refult of the gravity of all its particles, which consequently attracts the fun in proportion to their respective masses; besides, each body on the earth tends towards its centre proportionally to its mass, it reacts thereon, which is in the fame ratio. If that was not the case, and if any part of the earth, however small, attracted another part without being attracted by it, the centre of gravity would move in space, in virtue of the force of gravity, which is impossible.

The celestial phenomena, compared with the laws of motion, conduct us therefore to this great principle of nature, namely, that all the particles of matter attract each other in proportion to their masses, and inversely as the squares of their distance.

Already we may perceive in this universal gravitation, the caufe of the perturbations to which the heavenly bodies are subject; for the planets and comets being subject to the action of each other, they must deviate a little from the laws of the elliptic motion, which they would otherwise exactly follow, if they only obeyed the action of the fun. The satellites also, engaged in their motions round their planets by their mutual action, and that of the fun, deviate a little from these laws.

We perceive then that the particles of the heavenly bodies, united by their attraction, should form a mafs nearly spherical; and that the reful of their action at the surface of the body should produce all the phenomena of gravitation.

We fee moreover that the motion of rotation of the celestial bodies should slightly alter their spherical figure, and flatten them at the poles; and then the reful of all their mutual actions not passing through their centres of gravity, should produce in their axes or rotation similar motions to those discovered by observation. Finally, we may percei've why the parts of the ocean, unequally acted on by the sun and moon, should have oscillations similar to the ebbing and flowing of the tides. But these different effects of the principle of gravitation must be particularly developed, to give it all the certainty of which physical truth is susceptible.

It is in the universal application of this theory to all the known celestial phenomena, that the modern science of physical astronomy consists, a science which owes its origin to Newton, and which has been cultivated by every eminent mathematician, from the time of that great philosopher to the present day. It is to La Place that the merit must be given of having completed this theory, by showing that there remains not a single phenomenon that it is not capable of explaining; he justly observes, that there is no question here of vague causes, which cannot be submitted to analysis, and which the imagination modifies at pleasure, to accommodate them to the phenomena. The law of universal gravitation has this incomming advantage, that it may be reduced to calculation, and by a comparison of its results with observation, it presents the most certain method of verifying its existence; and so far are we from having to fear that new observations will disprove this theory, we may be assured before hand that they will only confirm it more and more, and that its consequences are equally certain as if they had actually been observed.

The astrononmical phenomena produced by the mutual gravitation of the heavenly bodies, will be found in the different parts of this work. As each subject will be particularly treated under its appropriate article, see Figure of the Earth; Preceding of the Equinoxes; Motion of he Earth's axis; Perturbation of the Planets, Moon, and Satellite; Tides, Libration of the Moon, &c.

But as the investigation of laws by which particles of matter gravitate to spheres and other solids cannot with propriety be referred to any other article, and as it forms to very essential a part of physical astronomy, we shall enter on the subject very fully. The more simple and easy investigations of astronomy suppose the action to be confined to simple gravitating points; now as such points exist in nature, it becomes requisite to consider the effect which an assemblage of these points will produce when arranged in different forms. Newton, who first entered upon these speculations, investigated almost all the cases which from applicable to physical astronomy, but professor Playfair has lately extended these researches, and has presented a paper on the subject to the Philosopbical Society of Edinburgh, which would reflect honour on the first mathematicians of Europe. A few of the leading propositions of this excellent memoir, will follow the investigation of the law of gravitation to a sphere.

Of the gravitation of particles of matter to spheres, and other mathematical figures.

1. A particle of matter placed within a sphere of uniform density, remains in equilibrium.

Let A L B M, a l b m, (Plate XV. Astronom:, fig. 12.) be two spherical surfaces, of which C is the common centre, and let the space between them be filled with gravitating matter, uniformly dense. Let p be a particle placed any where within this spherical shell; to every particle of which it gravitates with a force inversely as the square of its distance from it. This particle will have no tendency to move in any direction, because
its gravitation in any one direction is exactly balanced by an equal gravitation in the opposite direction.

Draw through $p$ the two straight lines $dp, pe$, making a very small angle at $p$. This may represent the section of a very slender double cone $dpe, ep$, having $p$ for the common vertex, and $de$ is for the diameter of the circular bases. The gravitation of $p$ to the matter in the base $de$ is equal to its gravitation to the matter in the base $e$. For the number of particles in $de$ is to the number in $e$, as the surface of the base $de$ to that of the base $e$, that is, as $de^2$ to $e^2$, that is, as $pd$ to $pe$, that is, as the gravitation to a particle in $de$ to the gravitation to a particle in $e$. Therefore the whole gravitation to the matter in $de$, is the same with the whole gravitation to the matter in $e$; since it is also in the opposite direction, the particle $p$ is in equilibrio. The same thing may be demonstrated of the gravitation to the matter in $q$, and $st$, and in a similar manner, of the gravitation to the matter in the sections of the cones $dp, ep$, by any other concentric surface. Consequently, the gravitation to the whole matter contained in the solid $dp, ep$, is equal to the gravitation to the whole matter in the solid $de, e$, and the particle $p$ is in equilibrio.

Now since the lines $dp, ep$, may be drawn in any direction, and thus be made to occupy the whole sphere, it is evident that the gravitation of $p$ is balanced in every direction, and therefore it has no tendency to move in any direction, in consequence of this gravitation to the spherical shell of matter comprehended between the surfaces $A L B M$ and $albn$.

It is also evident, that this holds true with respect to all the matter comprehended between $A L B M$, and the concentric surface $p n$ passing through $p$; in short $p$ is in equilibrio in its gravitation, to all the matter more remote than itself from the centre of the sphere, and appears as if it did not gravitate at all to any matter more remote from the centre.

We have suppos'd the spherical shell to be uniformly dense. But $p$ will still be in equilibrio, although the shell be made up of concentric strata of different densities, provided that each stratum be uniformly dense.

For if we suppos'd, that in the space comprehended between $A L B M$ and $p n$, there occurs a surface $albn$ of a different density from all the rest, the gravitation to the intercepted portions $gr$ and $st$ are equal, because those portions are of equal density, and are proportional to $pd^2$ and $pe^2$ inversely. The proposition may therefore be expressed in the following very general terms, "a particle placed any where within a spherical shell of gravitating matter, of equal density, at all equal distances from the centre, will be in equilibrio, and will have no tendency to move in any direction."

The equality of the gravitation to the surface $ed$, and to the surface $es$ is affirmed, because the numbers of particles in the two surfaces are inversely as the gravitations towards one in each.

For the very same reason, the gravitations towards the surfaces $ed$ and $qr$ and $ts$ are all equal. Hence may be derived an elementary proposition, which is of great use in all enquiries of this kind, namely,

If a cone, or pyramid $dp$, of uniform gravitating matter, be divided by parallel sections $de, qr, st$, &c. the gravitation of a particle $p$ in the vertex, to each of those sections, is the same, and the gravitations to the solids $pg, pd, qd, d$, &c. are proportional to their lengths $pg, pd, qd, d$, &c. the first part of this proposition is already demonstrated. Now, conceive the cone to be thus divided into innumerable slices of equal thickness: it is plain that the gravitation to each of these is the same; and, therefore, the gravitation to the solid $gr$, is to the gravitation to the solid $gd$, as the number of slices in the first, to the number of slices in the second, that is, as $pg$, the length of the first, to $qd$, the length of the second. The cone $dp$ was supposed extremely slender. This was not necessary for the demonstration of the particular case where all the sections were parallel; but in this elementary proposition, the angle at $p$ is supposed smaller than any alligned angle, that the cone or pyramid may be considered as one of the elements into which we may resolve a body of any form. In this resolution, the bases are supposed, if not otherwise expressly stated, to be parallel, and perpendicular to the axes; indeed, they are supposed to be portions $xy$, $yz$, $zx$, of spherical surfaces, having their centres in $p$: the small portions $xyz$, $xzy$, $yzx$, &c. are held as in insignificant, vanishing in the ultimate ratios of the whole.

It is easy, also, to see that the equilibrium of $p$ is not limited to the case of a spherical shell, but will hold true of any body composed of parallel strata, or strata formed, that the lines $p d$, $p e$, are cut in the same proportion by the sections $de$, $qr$, &c. In a spheroidal shell, for instance, whole inner and outer surfaces are similar, and similarly poited spheroids, the particle $p$ will be in equilibrio any where within it; because, in this case, the lines $pd$ and $ne$ are equal; so are the lines $p s$ and $od$, the lines $st$ and $rs$, the lines $qd$ and $dc$. In short, there is but one situation of the particle $p$ that injures this equilibrium.

But we may at the same time infer this very useful proposition,

2. If there be two solids, perfectly similar, and of the same uniform density, the gravitation to each of these solids, by a particle placed on or in each, is proportional to any homologous lines of the solids.

For, the solids being similar, they may be resolved into the same number of similar pyramids similarly placed in the solids. The gravitations to each of any corresponding pair of pyramids are proportional to the lengths of those pyramids. These lengths have the same proportion in every corresponding pair. Therefore, the absolute gravitations to the whole pyramids of one solid have the same ratio to the absolute gravitation to the whole pyramids of the other solid. And since the solids are similar, and the particles are at the similarly poited vertices of all the similar and similarly placed pyramids, the gravitation compounded of the absolute gravitations to the pyramids of one solid, has the same ratio to the gravitation similarly compounded of the absolute gravitations to the pyramids of the other.

3. The gravitation of an external particle to a spheroidal surface, strata, or entire sphere, which is equally dense at all equal distances from the centre, is the same as if the whole matter were collected in its centre.

Let $A L B M$ (fig. 124) represent such a sphere, and let $P$ be the external particle. Draw $P A C B$ through $C$, the centre of the sphere, and crost it by $L C M$ at right angles. Draw two right lines $PD$, $PE$, containing a very small angle at $P$, and cutting the great circle $A L B M$, in $D$, $E$, $F$, $G$. About $P$, as a centre with the distance $P C$, describe the arc $Cd m$, cutting $DP$ in $d$, and $EP$ in $e$. About the same centre describe the arc $DO$. Draw $d F$, $e G$, parallel to $AB$, and cutting $L C$ in $f$ and $g$. Draw $C K$ perpendicular to $PD$, and $H D, D S$, and $F E$, perpendicular to $AB$. Join $CD$ and $C F$.

Now, let the figure be suppos'd to turn round the axis $P B$. The semi-circumference $A L B$ will generate a complete spherical surface; the arc $CD$ will generate another spherical surface, having $P$ for the centre; the small
Gravitation.

Arcs \(DE, dE, FG\), will generate rings, or zones, of those spherical surfaces; \(DO\) will also generate a zone of a surface having \(P\) for its centre; \(fG\) and \(FI\) will generate zones of flat circular surfaces.

It is evident that the zones generated by \(DE\) and \(DO\), (which we may call the zones \(DE, DO\),) having the same radius \(D\), are to each other as their respective breadths \(DE, DO\). In like manner, the zones generated by \(de, fG, FI, FG\), being all at the same distance from the axis \(AB\), are as their respective breadths \(de, fG, FI, FG\).

But the zone \(DO\) is to the zone \(de\), as \(PD^2\) to \(PD^2\); for \(DO\) is to \(de\), as \(PD\) to \(PD\), and the radius of rotation \(D\) is to the radius \(dH\), also as \(PD\) to \(PD\). The circumstances, described by \(DO\) and \(de\), are, therefore, in the same proportion as \(PD^2\) to \(PD^2\); therefore the zones being as their breadths, and as their circumstances jointly, are as \(PD^2\) and \(PD^2\).

\(C\) and \(dH\), being the lines of the same arc \(CD\), are equal; therefore \(KD\) and \(fF\), the halves of chords equally distant from the centre, are also equal; therefore the triangles \(CDK\) and \(CFF\) are equal and similar. But \(CDK\) is similar to \(EDO\), for the right angles \(PDO\) and \(CDE\) are equal. Taking away the common angle \(CDO\), the remainders \(CDK\) and \(EDO\) are equal. In like manner, \(CFF\) and \(GF\) are similar; and, therefore, (since \(CD\) and \(CF\) are similar,) the elementary triangles \(EDO\) and \(GF\) are similar, and \(DO\) to \(DE\) is \(FI\) to \(GF\). The absolute gravitation, or tendency of \(P\), to the zone \(DO\), is equal to its absolute gravitation to the zone \(de\), because the number of particles in the first, is to the particles in the last, as \(PD^2\) to \(PD^2\); that is, as the gravitation to a particle in the first, to the gravitation to a particle in the last; therefore let \(e\) represent the circumference of a circle, whose radius is 1. The surface of the zone generated by \(DO\), will be \(DO \times \epsilon \times D^2\), and the gravitation to it will be \(DO \times \epsilon \times D^2\), to which \(\frac{d\epsilon \times \epsilon \times dH}{PD^2}\), or \(\frac{d\epsilon \times \epsilon \times dH}{PC^2}\), is equal. This expresses the absolute gravitation of the zone generated by \(DO\), this gravitation being exerted in the direction \(PD\).

But it is evident that the tendency of \(P\), arising from its gravitation to every particle in the zone, must be in the direction \(PC\). The oblique gravitation must, therefore, be estimated in the direction \(PC\), and must be reduced in the proportion of \(PD\) to \(PH\). It is plain that \(PD\) to \(PH\) is as \(de\) to \(fG\), because \(de\) and \(fG\) are perpendicular to \(PD\) and \(PH\); therefore the reduced, or central gravitation of \(P\) to the zone generated by \(DO\), will be expressed by \(fG \times \epsilon \times dH\).

But the gravitation to the zone generated by \(DO\), is to the gravitation to the zone generated by \(DE\), as \(DO\) to \(DE\), that is, as \(FI\) (or \(fG\)) to \(FG\). Therefore the central gravitation to the zone generated by \(DE\), will be expressed by \(\frac{FG \times \epsilon \times dH}{PC^2}\). Now, \(FG \times \epsilon \times dH\) is the value of the surface of the zone generated by \(FG\); and if all this matter were collected in \(C\), the gravitation of \(P\) to it would be \(\frac{FG \times \epsilon \times dH}{PC^2}\), and it would be in the direction \(PC\). Hence it follows, that the central gravitation of \(P\) to the zone generated by \(DE\), is the same as its gravitation to all the matter in the zone generated by \(FG\), if that matter were placed in \(C\).

What has been demonstrated respecting the arc \(DE\), is true of every portion of the circumference. Each has a substitute \(FG\), which being placed in the centre \(C\), the gravitation of \(P\) is the same. If \(PT\) touch the sphere in \(T\), every portion of the arc \(TL\) will have its substitute in the quadrant \(LB\), and every part of the arc \(AT\) has its substitute in the quadrant \(ATL\), as is easily seen. And hence it follows, that the gravitation of a particle, \(P\), to a spherical surface, \(ALBM\), is the same as if all the matter of that surface were collected in its centre.

We see also that the gravitation to the surface generated by the rotation of \(AT\) round \(AB\) is equal to the gravitation to the surface generated by \(TLB\), which is much larger but more remote.

What we have now demonstrated with respect to the surface generated by the semicircle \(ALB\), is equally true with regard to the surface generated by any concentric semicircle, such as \(a\). It is true, therefore, with regard to the shell comprehended between those two surfaces; for this shell may be resolved into innumerable concentric strata, and the proposition may be affirmed with respect to each of them, and therefore with respect to the whole. And this will be still true if the whole sphere be thus occupied.

Lastly, it follows that the proposition is still true, although these strata should differ in density, provided that each stratum is uniformly dense in every part.

It may, therefore, be affirmed in the most general terms, that a particle, \(P\), placed without a spherical surface, shell, or entire sphere, equally dense at equal distances from the centre, tends to the centre with the same force, as if the whole matter of the surface, shell, or sphere were collected there.

This will be found to be a very important proposition.

4. The gravitation of an external particle to a spherical surface, shell, or entire sphere, of uniform density at equal distances from the centre, is as the quantity of matter in that body directly; and as the square of the distance from its centre inversely.

For, if all the matter were collected in its centre, the gravitation would be the same, and it would then vary in the inverse duplicate ratio of the distance.

Cor. 1.—Particles placed on the surfaces of spheres of equal density, gravitate to the centres of those spheres with forces proportional to the radii of the spheres.

For the quantities of matter are as the cubes of the radii.

Therefore the gravitation \(g\) is as \(\frac{d^3}{d^2}\), that is, as \(a\).

Cor. 2.—The same thing holds true if the distance of the external particles from the centres of the spheres are as the diameters or radii of the spheres.

Cor. 3.—If a particle be placed within the surface of a sphere of uniform density, its gravitation at different distances from the centre will be as those distances. For, it will not be affected by any matter of the sphere that is more remote from the centre, and its gravitation to what is less remote, is as its distance from the centre by the half Cor.

5. The mutual gravitation of two spheres of uniform density in their concentric strata, is in the inverse duplicate ratio of the distance between their centres.

For the gravitation of each particle in the sphere \(A\), is to the sphere \(B\), the same as if all the matter in \(B\) were collected at its centre. Suppose it so placed:

The gravitation of \(B\) to \(A\) will be the same as if all the matter in \(A\) were collected at its centre. Therefore it will be as \(d^3\) inversely. But the gravitation of \(A\) to \(B\) is equal to that of \(B\) to \(A\). Therefore, \&c.

The absolute gravitation of two spheres whose quantities:
of matter are A and B, and the distance of their centres, is \( \frac{AB}{d} \). For the tendency of one particle of A to B, being the aggregate of its tendencies to every particle of B, is \( \frac{A \times B}{d^2} \). Therefore, the tendency of the whole of A to B must be \( \frac{AB}{d^2} \). And the tendency of B to A is equal to that of A to B.

6. But if the centripetal forces which tend to the different points of spheres are proportional to the simple distances from the attracting bodies, then the compound force with which two spheres attract each other mutually, is as the distance between the centres of the spheres.

Cafe 1.—Let A E B F (fig. 125.) be a sphere; S its centre; P a particle attracted; P A S B the axis of the sphere passing through the centre of the particle; E F, e f, two planes cutting the sphere and perpendicular to the axis, and equidistant one on one side, the other on the other, from the centre of the sphere; G and g the intersections of the planes and the axis; and H any point in the plane E F. The centripetal force of the point H on the particle P, exerted in the direction of the line P H, is as the distance P H; and the same exerted in the direction of the line P G, or towards the centre S, is as the length P G. Therefore, the force of all the points in the plane E F, (that is, of the whole plane) by which the particle P is attracted towards the centre S, is as the distance P G multiplied by the number of those points, that is, as the whole contained under that plane E F, and the distance P G. And, in like manner, the force of the plane e f, by which the particle P is attracted towards the centre S, is as that plane multiplied into its distance P g; or as the equal plane E F multiplied into that distance P g; and the sum of the forces of both planes is as the plane E F, multiplied into the sum of the distances P G + P g, that is, as that plane multiplied into twice the distance P S of the centre and the particle; that is, as twice the plane E F, multiplied into the distance P S, or as the sum of the equal planes E F + e f multiplied into the same distance. And by a similar train of reasoning, the forces of all the planes in the whole sphere, equidistant on each side from the centre of the sphere, are as the sum of those planes, multiplied into the distance P S, that is, as the whole sphere, and the distance P S jointly.

Cafe 2.—Let the particle P now attract the sphere A E B F, and, by the same reasoning, it will appear that the force with which the sphere is attracted is as the distance P S.

Cafe 3.—If another sphere be now composed of innumerable particles P, and because the force with which every particle is attracted is as the distance of the particle from the centre of the first sphere, and as the square of the distance conjugately, and is therefore the same as if the whole proceeded from a single particle situated in the centre of the sphere; the entire force with which all the particles in the second sphere are attracted, is that of which the whole sphere is attracted, will be the same as if that sphere were attracted by a force proceeding from a single particle in the centre of the first sphere, and is therefore proportional to the distance between the centres of the spheres.

Cafe 4.—Let the spheres attract each other mutually, and the force will be doubled, but the proportion will remain the same.

Cafe 5.—Let the particle P be placed within the sphere A E B F, (fig. 126.) and because the force of the plane e f, upon the particle, is as the solid contained under that plane and the distance p g; and the contrary force of the plane E F, is as the solid contained under that plane and the distance p G; the force compounded of both will be as the difference of the solids, that is, as the sum of the equal planes multiplied into half the difference of the distances; that is, as that sum multiplied into p S, the distance of the particle from the centre of the sphere. And, by a similar train of reasoning, the attraction of all the planes E F, e f, throughout the sphere, that is, the attraction of the whole sphere is conjointly as the sum of all the planes or as the whole sphere, and as p S the distance of the particle from the centre of the sphere.

Cafe 6.—And if a new sphere be now composed of innumerable particles, such as p, situated within the first sphere A E B F, it may be proved, as before, that the attraction, whether single of one sphere towards the other, or mutual of both towards each other, will be as the distance p S of the centres.

7. If the figures of the spheres be dissimilar and unequal, proceeding directly from the centre towards the circumference, but similar and equal throughout every circumference, at equal distances from the centres, and if the attractive force be as the distance of the attracted body, then the entire force with which two spheres of this kind attract each other mutually is proportional to the distance between the centres of the spheres. This is demonstrated from the preceding proposition.

The above investigations relate to the principal cases of attraction, namely, when the centripetal forces decrease in a duplicate ratio, or increase in the simple ratio of the distance. And it is remarkable that both these suppositions cause bodies to revolve in conic sections, and compose spheric bodies, whole centripetal forces observe the same law of increase or decrease, in the recedes from the centre, as the forces of the particles themselves do.

8. If a circle A E B (fig. 127.) be described round the centre S, and two circles E F, e f, be also described round the centre P, intersecting the former in E and e, and the line P S in F and f; and if E D, e d, be drawn perpendicular to P S; then if the distance of the arcs E F, e f, is supposed to be infinitely diminished, the limiting ratio of the evanescent line D d to the evanescent line F f is the same as that of the line P E to the line P S.

For if the line P E intersect the arc E F in q, and the right line E q, which coincides with the evanescent arc E q, be produced and meet the right line P S in T; and the perpendicular S G be drawn from S to P E, because the triangles D T E, d T e, D E S, are similar, D J will be to E e as D T to T E, or D S to E S; and because the triangles E q E, E S G, are similar, E e will be to e q or F F as E S to S G; and ex aequo D d is to F f as D E to S G; that is, (because the triangles P D E, P G S, are similar) as P E to P S.

9. If a superficiei, as E F f e (fig. 128.) be supposed to have its breadth infinitely diminished, and that by its revolution round the axis P S it describes a spheric concavo-convex solid to the several equal particles of which equal centripetal forces tend; then the force with which that solid attracts a particle placed at P is in a ratio compounded of the ratio of the solid D E' \times F f, and the ratio of the force with which the given particle in the place F f would attract the same particle.

For if the force be first considered of the spheric superfiicies F E, which is generated by the revolution of the arc F E, and is intersected any where, as in r, by the line d s, the annular part of the superficies generated by the revolution
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revolution of the arc \( r E \) will be as the small line \( D d \), the radius of the sphere remaining the same; as Archimedes has demonstrated in his book on the sphere and cylinder.

And the force of this superficies exerted in the direction of the lines \( P E \) or \( P r \) situated all round in the conical superficies, will be as this annular superficies itself; that is, as the line \( D d \) or, which is the same, as the rectangle under the given radius \( P E \) of the sphere, and the line \( D d \); but that force, exerted in the direction of the line \( P S \), tending to the centre \( S \), will be in the ratio of \( P D \) to \( P E \), and therefore will be as \( P D \times D d \).

If the line \( D F \) be now considered as divided into innumerable equal particles, each of which may be called \( D d \), then the superficies \( F E \) will be divided into so many equal annuli, whose forces will be as the sum of all the rectangles \( P D \times D d \); that is, as \( \frac{1}{2} P F^2 \times \frac{1}{2} P D \) and therefore as \( D E' \).

Let now the superficies \( F E \) be multiplied into the altitude \( F f \), and the force of the solid \( E F f \) exerted upon the particle \( P \) will be as \( D E' \times F f \); that is, if the force be given which any given particle, as \( F f \), exerts upon the particle \( P \) at the distance \( P F \). But if that force be not given, the force of the solid \( E F f \) will be as the solid \( D E' \times F f \); and that force not given conjointly.

10. If to the several equal parts of a sphere \( A B E \), fig. 125,) described about the centre \( S \), there tend equal centripetal forces; and from the several points \( D \), perpendicular \( D E \), drawn to the axis of the sphere \( A B \), in which a particle \( P \) is placed, moving in the sphere in \( E \); and if in these perpendiculars the length \( D N \), be taken as the quantity \( D E' \times PS \), and as the force which a particle of the sphere

situated in the axis exerts at the distance \( P E \) upon the particle

situated conjointly, then the whole force with which the particle \( P \) is attracted towards the sphere is as the area \( ANB \), comprehended under the axis of the sphere \( A B \), and the curve line \( ANB \), the locus of the point \( N \).

For supposing the construction in the last lemma, and theorem to remain, let the axis of the sphere \( A B \) be supposed to be divided into innumerable equal particles \( D d \), and the whole sphere to be divided into so many spherical conico-convex laminae \( E F f \), and let the perpendicular \( d n \) be drawn.

By the last theorem the force with which the lamina \( E F f \) attracts the particle \( P \), is as \( D E' \times F f \), and the force of one particle exerted at the distance \( P E \) or \( P F \) conjointly.

But (by the last lemma) \( D d \) is to \( F f \) as \( P E \) to \( P S \), and therefore \( F f \) is equal to \( D d \times \frac{D E' \times PS}{P E} \); and \( D E' \times F f \) is equal to \( D d \times \frac{D E' \times PS}{P E} \); and therefore the force of the lamina \( E F f \), is as \( D d \times \frac{D E' \times PS}{P E} \); and the force of a particle exerted at the distance \( P F \) conjointly; that is, by the supposition, as \( D N \times D d \), or as the evanescent area \( D N \times d \).

Therefore the forces of all the laminae exerted upon the particle \( P \) are as the areas \( D N d \), that is, the sphere will be as the whole area \( ANB \).

Cor. 1.—Hence if the centripetal force tending to the several particles remain always the same at all distances, and \( DN \) be made as \( \frac{D E' \times PS}{P E} \), the whole force with which the particle is attracted by the sphere is as the area \( ANB \).

Cor. 2.—If the centripetal force of the particles vary reciprocally as the distance of the particle attracted by \( A \), and

\[ \text{DN be made as } \frac{D E' \times PS}{P E}, \] the force with which the particle \( P \) is attracted by the whole sphere will be as the area \( ANB \).

Cor. 3.—If the centripetal force of the particles vary reciprocally as the cube of the distance of the particle attracted by it, and \( DN \) be made as \( \frac{D E' \times PS}{P E} \), the force with which the particle is attracted by the whole sphere will be as the area \( ANB \).

Cor. 4.—And universally of the centripetal force tending to the several particles of the sphere be supposed to be reciprocally as the quantity \( V \); and \( DN \) be made as \( \frac{D E' \times PS}{P E} \), the force with which a particle is attracted by the whole sphere will be as the area \( ANB \).

11. Supposing everything to remain as above, it is required to measure the area \( ANB \).

From the point \( P \) let the right line \( PH \) be drawn touching the sphere in \( H \); and having drawn \( HI \) perpendicular to the axis \( P A B \), bisect \( PI \) in \( L \), and \( PE' \) will be equal to \( PS' \times SE' \times 2 PSD \). But because the triangles \( SHP, SHI \), are similar, \( SE' \parallel SH' \) is equal to the rectangle \( PSI \).

Therefore \( PE' \) is equal to the rectangle contained under \( PS \) and \( PS \times SI \times 2 SD \); that is, under \( PS \) and \( 2 LS \times 2 LD \); that is, under \( PS \) and \( 2 LD \).

Moreover \( DE' \) is equal to \( SE'-SD' \), or \( SE'-LS'+2SLD-\frac{1}{2}LD \); that is, \( 2SLD-\frac{1}{2}LD \) ALB.

For \( LS'-SE' \), or \( LS'-SA' \), is equal to the rectangle \( ALB \).

Therefore if instead of \( DE' \) we write \( 2SLD-\frac{1}{2}LD \) ALB, the quantity \( DE' \times PS \) which is as the length of the ordinate \( DN \), will now resolve itself into three parts, \( \frac{2SLD \times PS}{PE \times V} \) \( \frac{PE \times V}{PE \times V} \) \( \frac{ALB \times PS}{PE \times V} \); where, if instead of \( V \) we write the inverse ratio of the centripetal force, and instead of \( PE \), the mean proportion between \( PS \) and \( 2 LD \), those parts will become the ordinates of so many curve lines, whose areas may be found by the common methods.

Ex. 1.—If the centripetal force tending to the several particles of the sphere be reciprocally as the distance, instead of \( V \) write \( PE \) the distance, then \( 2PS \times LD \) for \( PE' \); and \( DN \) will become as \( SL-\frac{1}{2}LD \) ALD.

Suppose \( DN \) equal to the double \( 2SL \times LD \) ALB.

and \( 2SL \) the given part of the ordinate drawn into the length \( AB \) will describe the rectangular area \( 2SL \times AB \); and the indefinite part \( LD \) drawn perpendicularly into the same length with a continued motion, according to such a law that its motion in each direction may, by increasing or decreas-

ing, remain always equal to the length \( LD \), will describe the area \( \frac{1}{2}LB - \frac{1}{2}LA \times \frac{1}{2}LD \), that is the area \( SL \times AB \); which taken from the former area \( 2SL \times AB \), leaves the area \( SL \times AB \). But the third part \( \frac{1}{2}LD \), drawn in a similar manner with a continued motion perpendicularly into the same length, will describe the area \( SL \times AB \); which subtracted from the area \( SL \times AB \) will leave \( AB \) the area sought. Whence this conclusion of the problem arises. At the points \( L, A, B \), (fig. 131.) erect the
the perpendiculars $L'$, $A'$, $B'$; making $A'$ equal to $L'B'$, and $B'$ equal to $A'L$. Making $L'$ and $L'B'$ asymptotes, describe through the points $a'$, $b'$, the hyperbolic curve $a'b'$; and the chord $a'b'$ being drawn, will enclose the area $a'b'$ equal to the area required $A'B'$.

Example 2.—If the centripetal force tending to the several particles of the sphere be reciprocally as the cube of the distance, or, (which is the same thing,) as that cube applied to any given plane; substitute $\frac{PE^3}{AS}$ for $V$, and $2PS \times LD$ for $PE'$; and $DN$ will become as $SL \times AS - AS^2 - ALB \times AS^2 - 2PS \times LD$; that is, (because $PS, AS, SI$ are continually proportional,) as $\frac{SLI}{LD} - \frac{1}{2} SI = \frac{ALB \times SI}{2LD}$. If these three parts be then drawn into the length $AB$, the first, $\frac{SLI}{LD}$, will generate the area of an hyperbola; the second, $\frac{1}{2} SI$, the area $\frac{1}{2} AB \times SI$; the third, $\frac{ALB \times SI}{2LD}$, the area $\frac{ALB \times SI}{2L'A'}$, that is, $\frac{1}{2} A'B \times SI$: from the first subtract the sum of the second and third, and there will remain $A'B$, the area sought. Whence arises this construction of the problem. At the points $L, A, S, B,$ (fig. 132) erect the perpendiculars $L', A', S', B'$, of which suppose $S'$ equal $SI$; and through the point $s$, to the asymptotes $L', L'B'$, describe the hyperbola $a'b'$, meeting the perpendiculars $A'a, B'b$, in $a$ and $b$, and the rectangle $2A'SI$, subtracted from the hyperbolic area $A'a \times b'B'$, will leave $A'B$, the area required.

Example 3.—If the centripetal force, tending to the several particles of the sphere, decrease in a quadruplicate ratio of the distance from the particles, substitute $\frac{PE^4}{2AS^3}$ for $V$, then $\sqrt[4]{2PS + LD}$ for $PE$, and $DN$ will become $\frac{SI' \times SL}{\sqrt{2S'I} \times \sqrt{2S'I}} - \frac{1}{\sqrt{2} \times \sqrt{2} SI} \times \frac{1}{\sqrt{2} \times \sqrt{2} LD} - \frac{SI' \times ALB}{2 \sqrt{2} S'I} = \frac{1}{\sqrt{2}} SI' - \sqrt{2} SI$. These three parts, drawn into the length $AB$, produce as many areas, namely, $\frac{2S'I \times SL}{\sqrt{2S'I}}$, and $\frac{SI' \times ALB}{\sqrt{2} S'I}$, into $\frac{1}{\sqrt{2}} LA = \sqrt{LB - \sqrt{LA}}$, and $\frac{1}{\sqrt{2}} S'I \times ALB$ into $\frac{1}{\sqrt{2}} LA - \frac{1}{\sqrt{2}} LB'$; and these, after the proper reduction, become $\frac{2S'I \times SL}{LI}, SI', and \frac{2S'I}{3LI}$: and these, by substracting the latter terms from the former, become $\frac{4S'I}{3LI}$; therefore the entire force with which the particle $P$ is attracted towards the centre of the sphere, is as $\frac{S'I}{PI}$, that is, reciprocally as $PS \times PL$.

The attraction of a particle, situated within the sphere, may be determined by the same method; but more expeditiously by the following theorem.

12. If $SI$, $SA$, $SP$, (fig. 133.) be taken continually proportional, in a sphere described round the centre $S$, with the radius $SA$, then the attraction of a particle within the sphere, in any place $P$, is to its attraction, without the sphere, in a place $P'$, in a ratio compounded of the sub-duplicate ratio of $IS$, $PS$, the distances from the centre, and the sub-duplicate ratio of the centripetal forces tending to the centre in those places, $P$ and $I$.

As, if the centripetal forces of the particles of the sphere be reciprocally as the distances of the particle attracted by them, the force with which the particle situated at $I$ is attracted by the entire sphere, will be to the force with which it is attracted at $P$, in a ratio compounded of the sub-duplicate ratio of the distance $SI$ to the distance $SP$, and the sub-duplicate ratio of the centripetal force in the place $I$, arising from any particle in the centre to the centripetal force in the place $P$, arising from the same particle in the centre; that is, in the sub-duplicate ratio of the distances $SI$, $SP$, to each other reciprocally. These two sub-duplicate ratios compose the ratio of equality; and, therefore, the attractions in $I$ and $P$, produced by the whole sphere, are equal. By a similar calculation, if the forces of the particles of the sphere are reciprocally in a duplicate ratio of the distance, it will be found that the attraction in $I$ is to the attraction in $P$, as the distance $SP$ to the semi-diameter $SA$ of the sphere. If those forces are reciprocally in a triplicate ratio of the distances, the attractions in $I$ and $P$ will be to each other as $SP^3$ to $SA^3$; if in a quadruplicate ratio, as $SP^4$ to $SA^4$. Therefore, since the attraction in $P$, in this last case, was found to be reciprocally as $PS^3 \times PI$, the attraction in $I$ will be reciprocally as $SA^3$ into $PI$; that is, because $SA^3$ is given reciprocally as $PI$; and the progression is the same indefinitely. The demonstration of this theorem is as follows:

Retaining the same construction as above, and a particle being in any place $P$, the ordinate $DN$ was found to be as $DE^4 \times IS \over TE \times V$; therefore, if $IE$ be drawn, that ordinate for any other place of the particle, as $I$, will become (substituting $PS$ and $PE$ for $IS$ and $IE$) as $DE^4 \times IS \over TE \times V$.

Suppose the centripetal forces proceeding from any point of the sphere, as $E$, to be to each other at the distances $IE$ and $PE$, as $PE$ to $IE$ (where the number $n$ denotes the index of the powers of $PE$ and $IE$); and those ordinates will become as $PE^4 \times IS \over PE^4 \times PS \times PE^n = IS \times IE^n$. Suppose the centripetal forces proceeding from any point of the sphere, as $E$, to be to each other at the distances $IE$ and $PE$, as $PE$ to $IE$ (where the number $n$ denotes the index of the powers of $PE$ and $IE$); and those ordinates will become as $PE^4 \times IS \over PE^4 \times PS \times PE^n = IS \times IE^n$. Because $S$, $I$, $E$, $SP$, are continually proportional, the triangles $SPE$, $SEI$, are alike; and hence $IE$ is to $PE$, as $IS$ to $SE$, or $SA$. Substitute the ratio of $IS$ to $SA$ for the ratio of $IE$ to $PE$, and the ratio of the ordinates becomes that of $PS \times IE^n$ to $SA \times PE^n$. But the ratio of $PS$ to $SA$ is sub-duplicate of that of the distances $PS$, $SI$, and the ratio of $IE^n$ to $PE^n$, (because $IE$ is to $PE$ as $IS$ to $SA$) is sub-duplicate of that of the forces at the distances $PS$, $IS$; therefore the ordinates, and consequently the areas which the ordinates describe, and the attractions proportional to them, are in a ratio compounded of those sub-duplicate ratios.

13. To find the force with which a particle, placed in the
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centre of a sphere, is attracted towards any segment of that sphere.

Let P (fig. 134.) be a particle in the centre of a sphere, and R B S D a segment thereof contained between the plane R D S, and spherical superficies R B S. Let D B be intersected in F by a spherical superficies E F G, described from the centre P, and let the segment be divided into the parts P F E G, P E D G; let that surface be supposed not purely mathematical, but phytical, leaving some but a very inconsiderable thickness; let that thickneff be called O, and (by what Archimedes has demonstrated) that superficies will be as P F x O; let us suppose besides, the attractive forces of the particles of the sphere, to be reciprocally as that power of the distances which n is the index; and the force with which the superficies

E F G attracts the body P will be

\[
\frac{2 \text{DE} \times \text{O}}{\text{PF}^{n+1}} - \frac{\text{DF}^2 \times \text{O}}{\text{PF}^n}
\]

Let the perpendicular F N, drawn into O, be proportional to this quantity, and the curvilinear area D B I, which the ordinate F N, drawn through the length D B, with a continued motion defcribes, will be as the whole force with which the whole segment R B S D attracts the body P.

14. To find the force with which a particle, placed without the centre of a sphere, in the axis of any segment, is attracted by that segment.

Let the body P, placed in the axis A D B, of the segment E B K (fig. 135.) be attracted by that segment: round the centre P, with the radius P E, let the spherical surface E F K be described; and let it divide the segment into two parts E B K F and E F K D E. Let the force of the former part be found by Prop. 11. and, the force of the latter part by Prop. 13. and the sum of the forces will be the force of the whole segment E B K D E.

These are the principal propositions by which Newton has investigated the nature of the attraction exercised by spherical bodies. In the thirteenth fection of the Principia, the author shews the manner in which the law of attraction is investigated for other bodies; the most interefting refults are contained in the following propofitions.

Of the attractive forces of bodies which are not of a spherical figure.

15. If a body be attracted by another, and its attraction be considerably stronger when it is contiguous to the attracting body, than when they are separated from one another by a very small interval; the forces of the particles of the attracting body decrease, as the attracted body recedes, in more than a duplicate ratio of the particles attracted.

16. If the forces of the particles, of which an attracting body is composed, decrease as the attracted body recedes, in a trinfec, or more than trinfec ratio of the distance from the particles, the attraction will be considerably stronger in the place of contact, than when the attracting and attracted bodies are separated from each, though by the moft minute interval.

17. If two bodies, similar to each other, and consisting of matter equally attracfive, attract separately two particles, proportional to those bodies, and in a similar situation to them; the accelerative attractions of the particles towards the entire bodies will be as the accelerative attractions of the particles towards particles of the bodies proportional to the whole, and similarly situated in them.

18. If the attractive forces of the equal particles of any body be as the distance of the places from the particles, the force of the whole body will tend to its centre of gravity; and will be the fame with the force of a globe, consisting of similar and equal matter, and having its centre in the centre of gravity.

19. If there be several bodies, consisting of equal particles, whose forces are as the distances of the places from each, the force compounded of all the forces by which any particle is attracted, will tend to the common centre of gravity of the attracting bodies; and will be the fame as if these attracting bodies, preserving their common centre of gravity, should unite therewith, and be formed into a globe.

20. If a solid be plane on one side, and infinitely extended on all other sides, and consist of equal particles equally attractive, whose forces decrease, as they recede from the solid in the ratio of any power greater than the square of the distances; and a particle placed towards either part of the plane is attracted by the force of the whole solid; then the attractive force of the whole solid, as it recedes from its plane superfaces, will decrease in the ratio of a power whose base is the distance of a particle from the plane, and is indeed lefs by three than the index of the power of the distances.

Though the above propositions are fufficient for all atmo-"
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\[ A \times \times A E ; \text{ and as this equation is sufficient to determine the nature of the curve to which it belongs, therefore all the sections of the solid, by planes that pass through } A \text{, are similar and equal curves;} \text{ and the fold, in consequence, may be conceived to be generated by the revolution of } A C B, \text{ any one of those curves, about } A \text{ as an axis.}

The solid so generated may be called the solid of greatest attraction, and the line } A C B \text{ the curve of equal attraction.

11. To find the equation between the coördinates of } A C B, \text{ the curve of equal attraction.}

From } C \text{ (fig. 136.), } \text{ draw } C E \text{ perpendicular to } A B \text{; let } A B = a, \ A E = x, \ E C = y. \text{ It has been found that } A B^2 \times A E = A C^3 \text{, that is}

\[ a^2 x = (x^2 + y^2) \text{, or } a^2 x = (x^2 + y^2)^2 \text{, which is an equation to a line of the fifth order.}

To obtain } y \text{ in terms of } x, x^2 + y^2 = a^2 x^\frac{3}{2} - x^2 \text{ and } y = x^\frac{3}{2} - x^2. \text{ Hence } y = \frac{3}{2} x^\frac{3}{2} - x^2, \text{ that is, } x = \frac{a}{3} \frac{3}{2} \sqrt{7}, \text{ or } 3 x^\frac{3}{2} = a. \text{ If } x \text{ be supposed greater than } a, \text{ it is impossible. No part of the curve, therefore, lies beyond } B.

The parts of the curve on opposite sides of the line } A B \text{ are similar and equal, because the positive and negative values of } y \text{ are equal. There is also another part of the curve on the side of } A \text{, opposite to } B, \text{ similar and equal to } A C B \text{; for the values of } y \text{ are the same, whether } x \text{ be positive or negative.

111. The curve may be easily confuted without having recourse to the value of } y \text{ just obtained. Let } A B = a \text{ (fig. 136.), } A C = z, \text{ and the angle } B A C = \frac{\pi}{2}. \text{ Then } A E = A C \times \cos \frac{\pi}{2} = a \cos \frac{\pi}{2}, \text{ and so}

\[ a \cos \frac{\pi}{2} \cdot \cos \pi = z, \text{ or } a \cos \pi = z. \text{ Hence } z = a \sqrt{2} r.

From this formula a value of } A C \text{ or } z \text{ may be found, or the angle } B A C \text{ be given; and if it be required to find } z \text{ in numbers, it may be conveniently calculated from this expression. A geometrical construction may also be easily derived from it. For if with the radius } A B, \text{ a circle } B F H \text{ be described from the centre } A \text{; if } A C \text{ be produced to meet the circumference in } F, \text{ and if } F G \text{ be drawn at right angles to } A B \text{, then}

\[ \frac{AG}{AB} = \cos \frac{\pi}{2} \text{, and so } z = a \times

\[ \sqrt{A B \times AG} = A C. \text{ Hence, if from the centre } A \text{, with the distance } A B, \text{ a circle } B F H \text{ be described, and if a circle be also described on the diameter } A B \text{ as } A K B \text{, then drawing any line } A F \text{ from } A \text{, meeting the circle } B F H \text{ in } F, \text{ and from } F \text{ letting fall } F G \text{ the perpendicular on } A B \text{, intersecting the semicircle } A K B \text{ in } K \text{, and if } A K \text{ be joined, and } A C \text{ made equal to } A K \text{, the point } C \text{ is on the curve.}

For } A K = \sqrt{A B \times AG} \text{, from the nature of the semicircle, and therefore } A C = \sqrt{A B \times AG} \text{, which has been shown to be a property of the curve. In this way a number of points of the curve may be determined; and the field of greatest attraction will be described, as already explained, by the revolution of this curve about the axis } A B.

IV. To find the area of the curve } A C B.

1. Let } A C E, A F G \text{ (fig. 135.) be two radii indefinitely near to one another, meeting the curve } A C B \text{ in } C \text{ and } F, \text{ and the circle described with the radius } A B \text{ in } E \text{ and } G. \text{ Let } A C = z \text{ as before, the angle } B A C = \pi, \text{ and } A B = a. \text{ Then } G E = a \sqrt{2}, \text{ and the area } A G E = \frac{1}{2}

\[ a^2 \frac{1}{2} z^2, \text{ and since } A E : A C : : \text{ sec } A E : \text{ sec } A E f. \text{ The sector } A C F = \frac{1}{2} z^2 \pi. \text{ But } z^2 = a^2 \cos \frac{\pi}{2}, \text{ whence the sector } A C F = \frac{1}{2} \pi a^2. \text{ But } z^2 = a^2 \cos \frac{\pi}{2} \text{, (III.) the sector } A C F \text{, or the fluxion of the area } A B C = \frac{1}{2} a^2 \frac{1}{2} \pi \cos \frac{\pi}{2}, \text{ and consequently the area } A B C = \frac{1}{2} a^2 \text{, fin. } z, \text{ to which no constant quantity need be added, because it vanishes when } z = 0 \text{, or when the area } A B C \text{ vanishes.}

The whole area of the curve therefore is } \frac{1}{2} a^2 \text{, or } \frac{1}{2} A B^2 \text{; for when } z \text{ is a right angle fin. } = 1. \text{ Hence the area of the curve on both sides of } A B \text{ is equal to the square of } A B.

2. The value of } x, \text{ or } x \text{, is a maximum, is easily found. For when } y \text{, and therefore } a^2 \text{, is a maximum, } \frac{1}{2} a^2 x - x = 0, \text{ or } x^2 = a. \text{ Hence } x = a \sqrt{2}, \text{ and therefore } a : b = \sqrt{2} : 2, \text{ or as } 1: 1: 1 \text{ nearly.

3. It is material to observe, that the radius of curvature } A \text{ is infinite: for since } y = a^2 x - x, x^2 = \frac{a^2}{x} - x, \text{ when } x \text{ be very small, or } y \text{ indefinitely near to } A, \text{ the circle becomes the diameter of the circle, having the same curvature with } A C B \text{ at } A; \text{ and when } A \text{ vanishes, this value of } y \text{, or}

\[ y = \frac{1}{2} x^2 - x \text{ becomes infinite, because of the divisor } a \text{ being in that case } = 0. \text{ The diameter, therefore, and the radius of curvature at } A \text{, are infinite. In other words, no circle, having its centre in } A B \text{ produced, and passing through } A, \text{ can be described with so great a radius, but that at the point } A \text{ it will be within the curve of equal attraction.

The field of greatest attraction then, at the extremity of its axis, where the attracted particle is placed, is exceedingly flat, approaching more nearly to a plane than the superficies of any sphere can do, however great its radius.

4. To find the radius of curvature at } B \text{, the other extremity of the axis, since } y = a^2 x - x, \text{ if we divide by}

\[ a - x, \text{ we have } y = \frac{a^2 x - x}{a - x} \text{ and so}

\[ \frac{a^2}{3} \frac{x}{a} \frac{1}{3} \frac{2}{3}. \text{ Hence the equation to the curve becomes in this case, } y = a^2 x - x, \text{ or } x = a \frac{1}{2} x^3 \text{, then we have } y = (a - x) \frac{1}{2} (a - x)^3.

But when } x \text{ is extremely small, its powers higher than the third may be rejected; and therefore } (a - x)^3 = a^3 \frac{1}{3} (1 - \frac{2}{3} x) \frac{1}{3}. \text{ Therefore the equation to the curve becomes in this case, } y = a^2 x - x, \text{ or } x = a^2 \frac{1}{2} a^2 - a^2 x + 2 x a x = a^2 \frac{1}{2} a^2 - a^2 x + 2 x a = \frac{1}{2} a^2 - a^2 x + a x.

Hence
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Hence \[ \frac{d^2}{dz^2}, \text{or the radius of curvature at } B = \frac{3}{2} a. \] The curve therefore at B falls wholly without the circle B K A, described on the diameter A B, as its radius of curvature is greater. This is also evident from the construction.

V. To find the force with which the solid above defined attracts the particle A in the direction A B.

Let B (fig. 137), be a point indefinitely near to B, and let the curve A c b be described similar to A C B; through C draw C D perpendicular to A B, and suppose the figure thus constructed to revolve about A B; then each of the curves A C B, A c b, will generate a solid of greatest attraction; and the excess of the one of these solids above the other, will be an indefinitely thin shell, the attraction of which is the variation of the attraction of the solid A C B when it changes into A c b.

Again, by the line D C, when it revolves along with the rest of the figure about A B, a circle will be described; and by the part C c, a circular ring, on which, if we suppose a solid of indefinitely small altitude to be constituted, it will make the element of the solid shell A C c. Now the attraction exerted by this circular ring upon A will be the same as if all the matter of it were united in the point C, and the same, therefore, as if it were all united in B.

But the circular ring generated by C c is \( \frac{\pi}{D} (D C - D c) = 2 \pi D C \times C c. \)

Now, \( 2 D C \times C c \) is the variation of \( y^2 \), or \( D C \), while \( D C \) passes into \( D c \), and the curve B C A into the curve b c A; that is, \( 2 D C \times C c \) is the fluxion of \( y^2 \), or of \( a^2 \); taken on the supposition that \( x \) is constant and \( y \) variable, namely \( \frac{1}{3} a^2 d x \). Therefore the space generated by \( C c = \frac{4 \pi}{3} a^2 d x. \)

If this expression be multiplied by \( x \), we have the element of the shell \( = \frac{4 \pi}{3} a^2 x d \).

In order to have the solidity of the shell A C B c, the above expression must be integrated relatively to \( x \), that is, supposing only \( x \) variable, and it is then \( \frac{1}{3} x \times \frac{4 \pi}{3} a^2 x d + C. \)

But \( C = C \), because the fluent vanishes when \( x \) vanishes, therefore the portion of the shell A C c = \( \frac{1}{3} x \times a^2 d \), and when \( x = a \) the whole shell \( = \frac{4 \pi}{3} a^2 d \).

Now, if the whole quantity of matter in the shell were united at B, its attractive force exerted on A would be the same with that of the shell, therefore the whole force of the shell \( = \frac{4 \pi}{3} a^2 d. \) The same is true for every other indefinitely thin shell, into which the solid may be supposed to be divided; and therefore, the whole attraction of the solid is equal to \( \int \frac{4 \pi}{3} a^2 d \), supposing a variable, that is, \( = \frac{4 \pi}{3} a^2 d. \)

Hence we may compare the attraction of this solid with that of a sphere of which the axis is A B, for the attraction of that sphere \( = \frac{\pi}{6} a^3 \times \frac{1}{3} a^2 = \frac{2 \pi}{3} a^5 \times a : \) the attraction of the solid ADBH (fig. 136), is therefore, to that of the sphere on the same axis as \( \frac{4 \pi}{3} a^2 \) to \( \frac{2 \pi}{3} a \), or as 6 to 5.

VI. To find the content of the solid ADBH, we need only integrate the fluxionary expression for the content of the shell, namely \( \frac{4 \pi}{3} a^2 d. \) We have then \( \frac{4 \pi}{15} a^2 \) = the content of the solid ADBH. Since the solidity of the sphere on the axis A is \( \frac{\pi}{6} a^3 \); the content of the solid ADBH is to that of the sphere on the same axis as \( \frac{4 \pi}{15} a^2 \) to \( \frac{\pi}{6} a^3 \); that is, as \( \frac{4 \pi}{15} \) to \( \frac{\pi}{6} \), or as 8 to 5.

VII. Lastly, to compare the attraction of this solid with the attraction of a sphere of equal bulk. Let \( m = \) any given mass of matter formed into the solid ADBH; then for determining A B, we have this equation \( \frac{4 \pi}{5} m^2 = \frac{\pi}{15} a^2 \); and, therefore, also, the attraction of the solid, \( \left( \text{which is } \frac{4 \pi}{5} a^2 \right) \) = \( \frac{4 \pi}{5} m^2 \sqrt{\frac{15}{4 \pi}} = m \left( \frac{4 \cdot 5^2 \cdot 3 \pi^2}{4 \cdot 5^5} \right) \)

= \( m \left( \frac{4 \cdot 5^2 \cdot 3 \pi^2}{4 \cdot 5^5} \right) \times \left( \frac{1 \cdot 4 \cdot 4 \cdot 5^4 \pi}{25} \right) \).

Again, if \( m \) be formed into a sphere, the radius of that sphere \( = \frac{\sqrt{3}}{4 \pi} \), and the attraction of it on a particle at its surface \( = \frac{m \left( \frac{16 \pi}{9} \right)}{m^2 \left( \frac{3}{4 \pi} \right)^2} \).

Hence the attraction of the solid ADBH is to that of a sphere equal to it, as \( m \left( \frac{16 \pi}{9} \right) \) to \( m \left( \frac{16 \pi}{9} \right)^2 \); that is, as \( (27)^2 \) to \( (25)^2 \), or as 3 to the cube root of 25.

The ratio of 3 to \( \frac{1}{25} \), is nearly that of 3 to \( \frac{3 - \frac{2}{27}}{3} \) or of 81 to 79; and this is therefore also nearly equal to the ratio of the attraction of the solid ADBH to that of a sphere of equal magnitude.

VIII. — It has been supposed in the preceding investigation, that the particle on which the solid of great attraction exerts its force, is in contact with that solid. Let it now be supposed, that the distance between the solid and the particle is given; the solid being in one of the plane of the plane and the particle at a given distance from the same plane on the opposite side. The mass of matter which is to compose the solid being given, it is required to construct the solid.

Let the particle to be attracted be at A (fig. 137), from A draw A A' perpendicular to the given plane, and let E F be any straight line in that plane drawn through the point A', it is evident that the axis of the solid required must be in A A' produced. Let B be the vertex of the solid, then it will be demonstrated as has been done above, that this solid is generated by the revolution of the curve of equal attraction, that of which the equation is \( y = a^2 x - x^2 \) about the axis of which one extremity is at A, and of which the length must be found from the quantity of matter in the solid.

The solid required then is a segment of the solid of great attraction, having B for its vertex, and a circle of which A E or A' F is the radius, for its base.

To find the solid content of such a segment, CD being \( y \), and A C = \( x \), we have \( y^2 = a^2 x^2 - x^2 \) and \( a^2 x^2 = \pi a^2 x^2 = \pi a^2 \times x^2 = \pi a^2 \times x^2 \) is the cylinder, which is the element of the solid segment.

Therefore \( \pi y^2 \), or the solid segment intercepted between B and D, must be \( \pi a^2 x^2 = \frac{\pi}{3} a^2 x^2 + C. \) This null vanishes when \( x = a \), or when C comes to B, and therefore
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fore \( C = \frac{4\pi}{15} a' \). The segment therefore intercepted between \( B \) and \( C \), the line \( A \) being \( x' \), is \( \frac{4\pi}{15} a' - \frac{3\pi}{5} \).

This also gives \( \frac{4\pi}{15} a' \), for the content of the whole solid,

when \( x = c \), the same value that was found by another method at \( VI \).

Now, if we suppose \( x \) to be \( = A A' \), and to be given \( = b \),

the solid content of the segment becomes \( \frac{4\pi}{15} a' - \frac{3\pi}{5} \).

\[ + \frac{\pi}{3} b \]  which must be made equal to the given solidity, which

we shall suppose \( m ^{3} \), and from this equation \( a' \), which is yet unknown, is to be determined. If then for \( a \) we put \( u \), we have \( \frac{\pi}{3} \) \( + 3 \) \( b \) \( u' - 3 \frac{1}{2} \) \( b \) \( u' - \frac{1}{2} b \) \( u' = \frac{m^{3}}{\pi} - \frac{b}{2} \), and \( u' = \frac{m^{3}}{\pi} - \frac{b}{2} \).

The simplest way of solving this equation would be by the rule of false position. In some particular cases it may be resolved more easily; thus, if \( \frac{15 m^{3}}{\pi} - \frac{b}{2} = c \), and \( a' = \frac{2}{3} b \), that is \( a'' = \frac{2}{3} b \), or \( a = b \times (\frac{2}{3}) \).

\[ \sqrt{\frac{729}{64}} \]

IX.—1. If it be required to find the equation to the superficies of the solid of greatest attraction, and also to the sections of its parallel to any plane passing through the axis; this can readily be done by help of what has been demonstrated above.

Let \( A H B \) (fig. 138), be a section of the solid, by a plane passing through \( A B \) its axis. Let \( G \) be any point in the superficies of the solid, \( F \) a perpendicular from \( G \) on the plane \( A H B \), and \( E F \) a perpendicular from \( F \) on the axis.

Let \( A E = x, \ E F = x, \ G F = x, \) then \( x, x, x, \) and \( x \) are the three co-ordinates by which the superficies is to be defined.

Let \( A B = a, \ E H = y, \) then from the nature of the curve \( A H B, y' = a^{2} x' - x'^{2} \). But, because the plane G H E is at right angles to \( A B, G \) and \( H \) are in the circumference of a circle of which \( E \) is the centre; so that \( G E = E H = y \).

Therefore \( E F^{2} + F G^{2} = E H^{2} \), that is \( x'^{2} + y'^{2} = a^{2} \), and by substitution for \( x'^{2} \) in the former equation, \( x'^{2} + y'^{2} = a^{2} x' - x'^{2} \), or \( a^{2} x' = x'^{2} \) which is the equation to the superficies of the solid of greatest attraction.

2. If we suppose \( E F \), that is \( e \), to be given \( = b \), and the solid to be cut by a plane through \( F \) and \( C \) being parallel to \( A B \) making on the surface of the solid the section \( D G C \); and if \( A K \) is drawn at right angles to \( A B \), meeting \( D C \) in \( K \), then we have, by writing \( b \) for \( e \) in either of the preceding equations, \( b^{2} + b' = a^{2} x' - x'^{2} \), and \( a^{2} = x'^{2} - x'^{2} = b^{2} \), for the equation to the curve \( D G C \), the co-ordinates being \( G F \) and \( F K \), because \( F K \) is equal to \( A L \) or \( a \).

This equation also belongs to a curve of equal attraction; the plane in which that curve is being parallel to \( A B \), the line in which the attraction is constant, and distant from it by the space \( b \).

Instead of reckoning the abscissa from \( K \), it may be made to begin at \( C \). If \( A E \) or \( C K = b \), then the value of \( b \) is determined from the equation \( b^{2} = a^{2} b^{2} - b' \), and if \( u = b + u \), \( b \) being put for \( C F \), \( u' = a^{2} (b + u)^{2} - b' \), or \( u' = (b + u)^{2} + b' = a^{2} (b + u)^{2} \), or \( (u' + b' + b') = a^{2} (b + u)^{2} \).

When \( b \) is equal to the maximum value of the ordinate \( E H \) (IV. 2) the curve \( C D G \) goes away into a point; and if \( b \) be supposed greater than this, the equation to the curve is impossible.

X.—The solid of greatest attraction may be found, and its properties investigated, in the same way that has now been exemplified, whatever be the law of the attractive force. It will be sufficient in any case to find the equation of the generating curve, or the curve of equal attraction.

Thus, if the attraction, which the particle \( C \) (fig. 136) exerts on the given particle at \( A \), be inversely as the \( m \) power of the distance, or as \( \frac{1}{A C} \), then the attraction in the direction \( A E \) will be \( \frac{A E}{A C + r} \), and if we make this \( = 1 \), we have \( \frac{A E}{A C + r} = \frac{1}{A B} m \), or making \( A E = x, L C = y \), and \( A B = a \), as before \( \frac{a}{a^{2} + x^{2} + y^{2} + \cdots} \).

If \( m = 1 \), or \( m + 1 = 2 \), this equation becomes \( y^{2} = a x - x^{2} \), being that of a circle of which the diameter is \( A B \).

If, therefore, the attracting force were inversely as the distance, the solid of greatest attraction would be a sphere.

If the force be inversely as the cube of the distance, or \( m = 3 \), and \( m + 1 = 4 \); the equation is \( y^{2} = a x - x^{3} \), which belongs to a line of the fourth order.

If \( m = 4 \), and \( m + 1 = 5 \); the equation is \( y^{2} = a x - x^{4} \), which belongs to a line of the tenth order.

In general, if \( m \) be an even number, the order of the curve is \( m + 1 \times 2 \); but if \( m \) be an odd number, it is \( m + 1 \) simply.

In the same manner that the solid of greatest attraction has been found, may a great class of similar problems be resolved. Whenever the property that is to exist in the greatest or least degree belongs to all the points of a plane figure, or to all the points of a solid, given in magnitude, the question is reduced to the determination of the locus of a certain equation, as in the preceding example.

Let \( s \), for instance, be required to find a solid given in magnitude, such, that from all the points in it, slant lines being drawn to any number of given points, the sum of the squares of the lines so drawn shall be a minimum. It will be found, by reasoning, as in the case of the solid of greatest attraction, that the superficies bounding the required solid must be such, that the sum of the squares of the lines drawn from any point in it, to all the given points, must always be of the same magnitude. Now, the sum of the squares of the lines drawn from any point, to all the given points, may be shown by plane geometry, to be equal to the square of the line drawn to the centre of gravity of those given points, multiplied by the number of points together with a given space.

The line, therefore, drawn from any point in the required superficies, to the centre of gravity of the given points, is given in magnitude, and therefore the superficies is that of a sphere,
GRA

sphere, having for its centre the centre of gravity of the given points.

The magnitude of the sphere is next determined from the condition that its solidity is given.

In general, if $x, y$ and $z$ are three rectangular co-ordinates, that determine the position of any point of a solid given in magnitude, and if the value of a certain function $z$ of $x, y, z$ be computed for each point of the solid, and if the sum of all these values of $z$ added together be a maximum or a minimum, the solid is bounded by a superficies, in which the function $z$ is everywhere of the same magnitude. That is, if the triple integral $\int \int \int z$ be the greatest or least possible, the superficies bounding the solid is such, that $z = A$, a constant quantity.

The same holds of plane figures. The proposition is then more simple, as there are only two co-ordinates, so that $\int x \int z$ is the quantity that is to be a maximum or minimum, and the line bounding the figure is defined by the equation $z = A$.

All the questions therefore that come under this description, though they belong to an order of problems, which requires in general the application of one of the most refined inventions of new geometry, the calculus variationium, form a particular division, admitting of solution by much more simple means, and directly reducible to the construction of loci.

In these problems also, the synthetical demonstration will be found extremely simple. In the instance of the solid of greatest attraction, this holds remarkably. Thus it is obvious, that $f(x, y, z)$ any particle of matter placed within the curve $A B C H$, will attract the particle at A in the direction $A B$, less than any of the particles in that curve, and that any particle of matter within the curve will attract the particle at A more than any particle in the curve, and more, $a fortiori$, than any particle without the curve. The same is true of the whole superficies of the solid. Now if the figure of the solid be any how changed while its quantity of matter remains the same, as much matter must be expelled from within the surface, at some place C, as is accumulated without the surface, at some other point H. But the action of any quantity of matter within the superficies $A B C H$ on A is greater than the action of the same without the superficies $A B C H$. The solid $A B C H$ therefore by any change of its figure must lose more attraction than it gains. Thus is its attraction not distinguished by every such change, and therefore it is itself the solid of greatest attraction.

Among a number of propositions which the limits of our work do not permit us to notice, it is proposed, "to determine the oblate spheroid of a given solidity, which shall attract a particle at its pole with the greatest force." And it appears that the gravitation at the pole of an oblate spheroid is not a maximum, until the excentricity of the generating ellipse vanish, and the spheroid passes into a sphere. When a sphere passes into an oblate spheroid its attraction varies at first exceeding slowly, and continues to do so till its oblateness, or excentricity, becomes very great.

The cone of greatest attraction has the radius of its base nearly double that of its altitude, and the attraction of the cone, when a maximum, is about $\frac{1}{2}$ the attraction of a sphere of equal solidity.

Of all the cylinders given in masts or quantity of matter, that which attracts a particle at the extremity of its axis with the greatest force is when the radius of the base of the cylinder is to the altitude as five to eight nearly, and it appears that the attraction of the cylinder, even when its form is the most advantageous, does not exceed that of a sphere of the fame solid content, by more than a hundred and eighty-third part.

A semi-cylinder given in magnitude, attracts a particle situated in the centre of its base, with the greatest possible, in the direction of a line biseecting the base, when the altitude of the semi-cylinder is to the radius of its base as 125 to 216.

GRAVITY, Centre of. See CENTER.

GRAVITY, Line of. See LINE.

GRAVITY, Plane of. See PLANE.

GRAVITY, Terrestrial is that force by which all bodies are continually urged towards the centre of the earth.

It is in consequence of this force that a body cannot remain at rest on the surface of the earth, without exercising a preasure either on some intermediate body, or on that portion of the surface of the earth which supports it; and the intensity of this force is measured by the degree of preasure, produced by a given mass. The tension of a string, by which a weight is suspended, arises from the force of gravity. The spring feel-yard, an instrument fold at the loops for weighing, is extremely well adapted to illustrate the effect of the force of gravity; the infufed fulbance draws out a scale by overcoming the refistance of the spring. These machines are not capable of great exactnecfs, but if an instrument of this kind could be made with sufficient accuracy, the alteration of the scale, (the weight remaining the same,) would shew any change in the force of gravity; and we might, by taking this apparatus to the summit of a high mountain, observe whether any change took place in the force of gravity by such an operation.

We measure likewise the force of gravity by the time which a body, suffered to descend freely from a state of rest, employs to fall through a given space, or (as has been explained under Dynamics) by the velocity which a body, thus falling, acquires at the end of a given time. Thus a body, falling freely, during the interval of one second, acquires a velocity of $52\frac{2}{3}$, that is, it would strike an obstacle with the same force as another body of the same mass, which was moving uniformly with the velocity of $52\frac{2}{3}$ per second.

The density of the earth being about $2\frac{1}{2}$ that of water, we infer that the force of gravity of a sphere, 8000 miles in diameter, and whose specific gravity is twice and a half that of water, would attract a particle of matter placed jut without its surface, in such a manner as to cause it to move towards its centre, $16\frac{2}{3}$ feet in one second.

It is, however, to be observed, that it is only at the pole that the whole force of the earth's gravity is actually exerted on a particle of matter; at every other part of the earth's surface, the force of gravity is diminished by the motion of rotation, which producing a centrifugal force, opposite in its tendency to that of the force of gravity, diminishes the effect of the latter as we recede from the pole and approach the equator. But, besides this, there is another cause which contributes in a very remarkable manner to modify the force of gravity at different points of the earth's surface, which is the elliptic figure of the earth.

The equatorial regions being more elevated than the polar, are more removed from the influence of the central attraction. Both these circumstances, and their effects, must be attended to when we propose to make any very accurate computation of the force of terrestrial gravity.

The diminution of gravity arising from the elliptic figure is nearly equal to the product of the $\frac{1}{15}$th part of the force of gravity, by the square of the cosine of the latitude. The centrifugal force diminishes the force of gravity in the same proportion; thus by the combination of these two causes, the diminution of gravity from the pole to the equator

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equator is equal to 0.0694 multiplied by the square of the cosine of the latitude, the force of gravity at the equator being taken as unity.

The most exact instrument we possess, for measuring the intensity of the force, is the pendulum, whose oscillations are immediately accelerated or retarded by the slightest alteration in the force of gravity, and it is only by means of this instrument that we are enabled to infer with precision, the exact space that a heavy body falls through in one second of time.

**Gravity. The Nature of.**—Of the nature of gravitation, or the force of gravity, nothing more is known, than that it is apparently an essential property of matter, or, at least, of all matter that hitherto has become the object of human investigation, for Newton was not disposed to believe that that matter might exist which was not endowed with this property, and suggests the supposition that it is caused by the agency of an elastic medium pervading all space. This medium, he supposes, to be much rarer within the dense bodies of the sun, the stars, the planets, and the comets, than in the empty celestial spaces between them, and to grow more and more dense at greater distances from them, so that all these bodies are naturally forced towards each other by the excess of pressure. Upon this supposition, Dr. Young remarks, in his Lectures, that the effects of gravitation might be produced by a medium thus constituted, if its particles were repelled by all material substances with a force decreasing like other repulsive forces, simply as the distances increase; its density would then be every where such as to produce the appearance of an attraction, varying like that of gravitation. Such an ethereal medium would, therefore, have the advantage of simplicity, in the original law of its action, since the repulsive force, which is known to belong to all matter, would be sufficient, when thus modified, to account for the principal phenomena of attraction.

It may be questioned whether a medium, capable of producing the effects of gravitation in this manner, would also be equally susceptible of those modifications which have been supposed necessary to the transmission of light. In either case, it must be supposed to pass through the apparent substance of all material bodies with the most perfect freedom, and there would, therefore, be no occasion to apprehend any difficulty from a retardation of the celestial motion; the ultimate impenetrable particles of matter being, perhaps, scattered as thinly through its external form as stars are scattered in a nebula, which has still the distant appearance of an uniform light; and there seems no reason to doubt the possibility of the propagation of an undulation through the Newtonian medium, with the actual velocity of light.

It must be remembered, that the difference of its pressure is not to be estimated from the actual bulk of the earth, or any other planet alone, but from the effect of the sphere of repulsion of which that planet is the centre; and we may thus deduce the force of gravitation from a medium of no very enormous density.

Dr. Young observes, that a similar combination of a simple pressure with a variable repulsion is also observable in the force of cohesion, and supposes that if two particles of matter, floating in such an elastic medium, capable of producing gravitation, were to approach each other, their mutual attraction would at once be changed from gravitation to cohesion, upon the exclusion of the portion of the medium interceding between them. The well-known experiment of the two exhausted hemispheres of Magdeburg affords an illustration of this hypothesis, where we see apparent cohesion derived from atmospheric pressure, and if we place between them a thick ring of elastic gum, we may represent the natural equilibrium between the forces of cohesion and repulsion, for the ring would resist any small additional pressure with the same force as would be required for separating the hemispheres so far as to allow it to expand in an equal degree; and at a certain point the ring would expand no more; the air would be admitted and the cohesion destroyed, as when a fold of any kind is torn asunder. These suppositions, however, are directly opposite to the hypothesis which affirms to the elastic medium the power of passing freely through all the interstices of the ultimate atoms of matter, since it could never pass between two atoms cohering in this manner; we cannot, therefore, at present assert the identity of the forces gravitation and cohesion so strongly as theory would allow us to do if established. In short, the whole of our enquiries respecting the intimate nature of forces must be considered as merely speculative amusements, which are of no farther utility than as they make our views more general, and affird our experimental investigations.

La Place, after having shown how the law of gravitation is deduced from the phenomena of the solar system, concludes his reflections on this subject by enquiring whether the principle of gravitation is a primordial law of nature, or if it may not be the general effect of some unknown cause? Here, he observes, we are stopped by our ignorance of the nature of the intimate properties of matter, and deprived of every hope of answering this question in a satisfactory manner. Indeed, says this great author, of forming hypotheses on this subject, let us content ourselves with examining more particularly the manner in which this principle has been employed by philosophers.

They have admitted the five following suppositions:

1. That gravitation takes place between the most minute particles of bodies.
2. That it is proportional to the masses.
3. That it varies inversely as the square of the distance.
4. That it is transmitted instantaneously from one body to another.
5. And that it equally acts on bodies in a state of repose, and on those which by their motion in the direction of its action should seem likely to avoid a part of its influence.

The first of these propositions is, as we have seen, a necessary result of the equality which exists between action and reaction, every particle of the earth attracting it as the particle itself is attracted; this supposition is confirmed by the measures of the degrees of the meridian, and by experiments on pendulums; for amidst all the irregularities of the measured degrees, we may perceive the traces of a regular figure, which is conformable to the theory. The great influence that the comparison of Jupiter has upon the nodes and perigees of the orbits of its satellites, proves to us that the attraction of this planet is composed of the attractions of all its particles. The proportionality of the attractive force to the masses is demonstrated in the earth by experiments on pendulums, the oscillations of which are of the same length of whatever substance they are composed. It is proved in the celestial regions by the constant relation which exists between the squares of the periodic times of bodies revolving about a common focus, to the cubes of the greater axes of their orbits.

We have seen with what precision the almost absolute state of repose of the perihelia of the planetary orbits indicate that the force of gravity varies according to the inverse square of the distance; and now that we know the cause of the motions of these perihelia, we may regard this law as rigorously exact. It is the same with all emulations which proceed from a centre, such as light;
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light; it seems as if all forces whose action could be perceived at sensible distances obeyed this law. It has lately been observed, that the attractions and repulsions of electricity and magnetism decrease in proportion to the squares of the distances. A remarkable property of this law is, that if the dimensions of all the bodies of the universe, their mutual distances and velocities were to be augmented or diminished proportionally, they would describe curves entirely similar to those described at present, and their appearances would be entirely the same. For the forces which animate them being entirely the result of attractions proportional to the masses divided by the squares of the distances, they would be augmented and diminished proportionally to the dimensions of this imaginary universe. It may be remarked at the same time that this property can only belong to the law of nature. Thus the apparent motions are independent of its absolute dimensions, as they are likewise of the motions it may have in space, and we can only observe and recognize relative phenomena.

It is this law which gives to spheres the property of attracting each other mutually, as if their whole masses were united at their respective centres. It determines also the orbits and the figures of the celestial bodies by lines and surfaces of the second order, at least if we neglect their perturbations and suppose them fluid.

We have no method of measuring the length of time in which gravity is propagated, because the action of the sun having once reached the planets, it continues to act on them as if the attractive force was communicated instantaneously to the extremities of the system. We cannot, therefore, ascertain in how long a time it is transmitted to the earth, no more than we could measure the velocity of light, were it not for the aberration, and the eclipses of Jupiter’s satellites. But it is not the same with the small difference that may exist in the action of gravity upon bodies according to the direction of their velocity.

M. de la Place has found by analysis, that an acceleration should result in the mean motions of the planets round the sun, and in the mean motions of the satellites about their planets.

M. de la Place had assumed this method of explaining the secular equation of the moon, when he believed, with other geometers, that it was inexplicable on the principle of universal gravitation. He found that if it arose from the same cause, a variation should be made in the contrary direction of the moon, in order to release it entirely from its gravity towards the earth, at least six million times greater than that of light; the true cause of this equation being now known, we are certain that the action of gravity is much greater than this. This force, therefore, acts with a velocity which we may consider as infinite; and we may conclude, that the action of the sun is transmitted in an invisible instant to the extremities of the planetary system.

Do any other forces act on the heavenly bodies beside their mutual attractions?

We are unacquainted with any, and we may affirm that their effect is totally insensible. We may likewise be certain that these bodies experience no sensible resistance from the fluids through which they pass, as light, the tails of comets, or the zodiacal light.

The attractive force disappears between bodies of an inconsiderable magnitude, and re-appears in their elements under a variety of forms. The solidity of bodies, their crystallization, the refraction of light, the elevation and defension of fluids in capillary tubes, and all chemical combinations, generally are the results of attractive forces, the knowledge of which forms the principal object of natural philosophy.

Are these forces the same as that of the gravity observed in the celestial regions, and modified on the earth by the figures of the integrant particles? To admit this hypothesis we must suppose much more space empty than full in all bodies, so that the density of their particles must be incomparably greater than the mean density of their whole volume. A spherical particle of one hundred thousandth of a foot in diameter should have a density at least ten thousand million of times greater than the mean density of the earth, to exert at its surface an attraction equal to the terrestrial gravity. But the attractive forces of bodies greatly far surpass this gravity, since they reflect light, whose direction is not changed by the attraction of the earth. The density of these particles should, therefore, be to that of substances in a ratio which the imagination would fear to admit, if their affinities depended on the law of universal gravitation. The ratio of the intervals which separate the particles of bodies to their respective dimensions, would be of the same order as in flars which form a nebula, which in this point of view may be considered as an immeasurable body. There is no reason, however, which absolutely forbids us to consider all bodies in this manner. Many phenomena are favourable to the supposition, particularly the extreme facility with which light penetrates diaphanous substances in all directions. The affinities would then depend on the integrant particles, and we might, by the variety of these forms, explain all the variety of attractive forces, and reduce to one general law all the phenomena of astronomy and natural philosophy. But the impossibility of ascertaining these figures, renders this investigation useless to the advancement of science.

Some geometers, to account for these affinities, have added to the laws of attraction, inversely as the squares of the distances, new terms which are insensible at small distances; but these terms would be the expressions of as many different forces, and besides being complicated with the different figures of the particles, they would only complicate the explanation of the phenomena.

Amidst these uncertainties the wise plan seems to be, to endeavour to determine by numerous experiments the laws of affinities; and to effect this, the most simple method appears to be, by comparing these forces with the repulsive force of heat, which may be itself compared with that of gravity. Some experiments already made with this view, afford us reason to hope, that one day these laws will be perfectly known, and that then, by the application of analysis, the philosophy of terrestrial bodies may be brought to the same degree of perfection, which the discovery of universal gravitation has procured for astronomy.

GRAVITY, in Hydrostatics. The laws of bodies gravitating in fluids, make the business of hydrostatics.

Gravity is here divided into absolute and specific.

Gravity, absolute or true, is the whole force with which the body tends downward.

Gravity, specific, called also relative, comparative, and apparent gravity, is the excess of gravity in any body, above that of an equal quantity or bulk of another; and denotes that gravity, or weight, peculiar to each species, or kind of natural body; and whereby it is distinguished from all other kinds.

In this sense, a body is said to be specifically heavier than another, when under the same bulk it contains a greater weight than that other; and that other is said to be specifically lighter than the first. Thus, if there be two equal spheres, each a foot in diameter; the one wood, the other lead, since the leaden one is found heavier than the wooden
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one, it is said to be specifically, or in specific, heavier: and the wooden one specifically lighter.

This kind of gravity some call relative; in opposition to absolute gravity, which increases in proportion to the quantity or mass of the body.

Gravity, law of the specific, and buoyancy of bodies.—I. If two bodies be equal in bulk, their specific gravities are to each other as their absolute gravities. Thus a body is said to be twice as heavy, specifically, as another, if it have twice its gravity under the same bulk.

Hence, the specific gravities of equal bodies are as their denfities.

II. If two bodies, compared together, be of the same specific gravity, their absolute weights will be as their magnitudes or bulks.

III. The specific gravities of bodies of the same weight are in the reciprocal ratio of their bulks. Hence the masses of two bodies of the same weight are in a reciprocal ratio of their bulks.

IV. The specific gravities of two bodies are in a ratio compounded of the direct ratio of the absolute gravities, and the reciprocal one of their bulks. Hence, again, the specific gravities are as the denfities.

V. The absolute gravities of two bodies will be in a compound ratio of their specific gravities and their bulks.

VI. The bulks of two bodies will be in a compound ratio of their absolute gravities directly, and their specific gravities inversely.

VII. A body specifically heavier than a fluid, lofs so much of its weight therein as is equal to the weight of a quantity of the fluid of the same bulk.

For, suppose a cubic inch of lead immersed in water; a cubic inch of water will, thereby, be expelled from its place: but the weight of this water was fulfilled by the refilance of the ambient water. Therefore, such a part of the weight of the leaden cube must be refilled by the refilance of the ambient water, as is equal to the weight of the water expelled. The gravity of the body immersed, therefore, must be diminished by so much.

Hence, 1. Since a fluid, specifically heavier, has a greater weight, in the same bulk, than a lighter; the same body will lose a greater part of its weight in a fluid, specifically heavier, than in a lighter: and therefore it weighs more in a lighter than a heavier.

2. Equal homogeneous bodies weighing equally in air, lofe their equilibrium if one of them be immersed in a heavier fluid; the other in a lighter.

3. Since the specific gravities are as the absolute gravities under the same bulk; the specific gravity of the fluid will be to the gravity of the body immersed, as part of the weight lost by the fluid, to the whole weight.

4. Two solids, equal in bulk, loose the same weight in the same fluid; but the weight of the specifically heavier body is greater than that of the specifically lighter; therefore, the specifically lighter lofs a greater part of its weight than the specifically heavier.

5. Since the bulks of bodies, equal in weight, are reciprocally as the specific gravities; the specifically lighter lofs more weight in the same fluid than the heavier; wherefore, if they be in equilibrium in one fluid, they will not be so in another; but the specifically heavier will preponderate, and that the more, as the fluid is denser.

6. The specific gravities of fluids are as the weights lost by the same body immersed in the same.

VIII. To find the specific gravity of a fluid.—On one arm of a balance suspend a leaden globe; and to the other, fallen a weight, which is in equilibrium therewith in air. Immerge the globe successively in the several fluids, while specific gravities are to be determined, and observe the weight which balances it in each. These several weights, subtrahend, severally, from the first weight, the remainders are the parts of the weight lost in each fluid. Whence the ratio of the specific gravity of the fluids is seen.

Hence, as the denfities are as the specific gravities, we find the ratio of the denfities of the fluids at the same time.

This problem is of the utmost use: as by it the degree of purity or goodness of fluids is easily found; a thing not only of service in natural philosophy, but also in common life, and in the practice of physic. See Hydrometer.

That the specific gravity may be found the more accurately, the weight of the thread not immersed in the fluid is to be subtracted from the weight of the solid in air; and the force necessary to make the thread subside (if it be specifically lighter) is to be added to the weight lost. But if the thread that sustains the solid be heavier than the fluid, the weight of the thread in the air is to be subtracted from the weight of the solid in air; and the weight the thread loses from the weight lost in the fluid. Indeed, this precaution may be spared, if, in examining the specific gravity of several fluids, care be taken that the same thread be immersed in the same depth in each.

IX. To determine the ratio which the specific gravity of a fluid has to the specific gravity of a solid that is specifically heavier than the fluid.

Weigh any mafs of the solid in a fluid, and note the just weight therein; the specific gravity of the fluid will be to that of the solid, as the part of the weight lost by the solid to its whole weight.

X. The specific gravities of equally heavy bodies are reciprocally as the quantities of weight lofte in the same fluid. Hence we find the ratio of the specific gravities of solids, by weighing masses thereof, that are equal in air, in the same fluid; and noting the weights lost by each.

XI. A body, specifically heavier, depends in a fluid specifically lighter, with a force equal to the excess of its weight, above that of an equal quantity of the fluid.

Hence, 1. The force which sustains a specifically heavier body in a fluid, is equal to the excess of the absolute gravity of the body, above that of the fluid, under the same bulk: e. gr. 47 lbs. of copper loses 5 lbs. of its weight in water; therefore a power of 42 lbs. is able to sustain it.

2. Since the excess of the weight of a solid over the weight of a fluid specifically heavier, is less than that over the weight of a specifically lighter fluid under the same bulk; it will descend with less force in a specifically heavier fluid than in a lighter; and, consequently, it will descend more slowly in the former than in the latter.

XII. A specifically lighter body sinks in a heavier fluid, till the weight of a quantity of the fluid, equal in bulk to the part immersed, be equal to the weight of the whole body.

Hence, 1. Since the specific gravities of bodies of the same weight are reciprocally as their bulks; and the bulks of fluids equal in weight, are as the parts of the same fluid immersed therein; the specific gravities of fluids are reciprocally as the parts of the same body immersed therein.

2. A solid, therefore, immerges deeper in a lighter fluid than in a heavier, and deeper, as the proportion of the specific gravity of the solid to that of the fluid is greater.

3. If a body be of the same specific gravity with a fluid,
the whole body will be immerged; and it will remain in any given place of the fluid.

4. If a specifically lighter body be wholly immersed in a fluid, it will be urged, by the collaterals of the fluid, to ascend with a force equal to the excess of the weight of the fluid, bulk for bulk, over the weight of the solid.

5. A body, therefore, specifically lighter, lying on the bottom of a vessel, will not be raised up, unless the heavier fluid rise above such a part as is equal in bulk to a quantity of the fluid of the fame weight with the whole solid.

XIII. The specific gravity of a solid is to the specific gravity of a lighter fluid, wherein it is immersed, as the bulk of the part immerged is to the whole bulk.

XIV. The specific gravities of equal solids are as their parts immerged in the same fluid.

XV. The weight and bulk of a specifically lighter body, and the weight of the specifically heavier fluid, being given, to find the force required, to keep the solid wholly immerged under the fluid.

As this force is equal to the excess of the weight of the fluid beyond that of an equal bulk of the solid; from the given bulk of the solid, and the weight of a cubic foot of water, find, by the rule of three, the weight of a bulk of water equal to that of the body. From this subtract the weight of the solid; the remainder is the force required.

E. g. Suppose the force necessary to detain a solid eight feet in bulk, and 100 pounds in weight, under water, required; since a cubic foot of water is found to weigh 70 pounds, the weight of water under the bulk of eight feet, is 560; whence, 100 pounds, the weight of the solid, being subtracted; the remainder 460 pounds is the force necessary to detain the solid under water.

Hence, since a specifically lighter body ascends in a heavier fluid, with the same force that would prevent its ascent; by the present problem, we can likewise find the force wherewith a specifically lighter body ascends in a heavier.

XVI. The weight of a vessel, to be made of a specifically heavier matter; and that of a specifically lighter fluid, being given: to determine the cavity the vessel must have to swim on the fluid.

The weight of a cubic foot of the fluid being given, the bulk of the fluid equal to the weight of the vessel is found by the rule of three. If, then, the cavity be made a little bigger than this, the vessel will have less weight under the same bulk than the fluid, and will therefore be specifically lighter than the same, and consequently it will swim.

XVII. The force employed to retain a specifically lighter solid, under a heavier fluid; and the weight lost by a heavier solid in a lighter fluid, are each added to the weight of the fluid, and weigh together with it.

The several theorems here delivered, are not only all demonstrable from the principles of mechanics, but are conformable to experiment. In effect, experience is here found to answer exactly to calculation, as is abundantly evident from the courses of philosophical experiments, now frequently exhibited; where the laws of specific gravitation are well illustrated. See Hydrostatical balance.

The specific gravity of any substance is the relative weight of a given volume of it, compared with the same volume of some other substance taken as a standard, and which is usually distilled water at some given temperature. The absolute gravity of a body is its entire weight, its specific gravity is the weight of a given portion, as a cubic foot or cubic inch. As it would be very difficult, and in many cases impossible, to measure the exact volume required to be weighed, a method of determining the specific gravity of solids has been devised, founded on a principle of Archimedes. It appears to have been known to the Ancients, that when a solid body, heavier than water, is plunged into that fluid, it loses as much of its weight as is equal to the weight of the fluid it has displaced.

By the application of this principle we are enabled, in a very easy manner, to determine the specific gravity of a body by first weighing it in air and afterwards in water. Then if the weight in air be divided by the weight lost, or the difference of the weights in water and air, the quotient will express the specific gravity of that body, or the relative weight of an equal volume of that substance, and of the water in which the experiment was made.

The specific gravity of two fluids may be determined by the same principle; for if we weigh a solid of any magnitude, as a ball of glass, first in water and then in any other fluid, the quantities of weight lost in each experiment will be in the same proportion as the specific gravity of the two fluids.

The specific gravities of any substances, and in particular of fluids, such as are lighter than water, may also be very conveniently determined by means of a common balance, employing a phial with a common ground stopple filling it first with water and then either with a given fluid, or with a portion of the fluid of which the weight has been ascertained, together with as much water as is sufficient to exclude the air.

It is necessary to attend to a great number of minute circumstances when we wish to determine the specific gravities of substances to a great degree of accuracy; these will be particularly noticed when describing the particular instruments that have been invented for the purpose. See Hydrostatic, Balance, Hydrometer, &c.

One mode of ascertaining the specific gravities of fluids, differing but little from each other in density, is to have a series of globules of glass so loaded, as to correspond to the specific gravities indicated by as many numbers, which are marked on them, and throwing several of them together into the fluid, and to observe which of them remains nearly stationary, without either rising to the surface or sinking. This method, though not expeditious, appears to be very secure from error, and is well adapted to determine the strength of spirituous liquors. But in all these experiments it is necessary to be aware that a considerable change of the joint bulk of two substances is often produced by their mixture, and that in general their dimensions are considerably contracted. Thus, 18 gallons of water and 18 gallons of alcohol, instead of 36 gallons, make only 35 gallons, consequently the specific gravity of the compound is one 35th greater than the mean of the specific gravities of the ingredients. And in some cases the whole dimension of a single substance may even be contracted by the addition of another substance; thus iron, by the addition of one-eighth of its bulk of platinum, becomes contracted one-fourth of that bulk.

For measuring the specific gravity of gasses, Mr. Leslie has devised a new method, which consists in observing the time employed in emptying a vessel through a small orifice, by means of the pressure of an equal column of water.

A Table of Specific Gravities.

Principally from Davies and Lavother. Davies’s table is compiled with great diligence from many different authors; Lavother’s is chiefly extracted from Drillon; it is carried.
GRAVITY.

to four places of decimals, but little dependence can be placed on the last.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Platina, purif.</td>
<td>19.5000</td>
</tr>
<tr>
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</tr>
<tr>
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<tr>
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<td>19.6798</td>
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</tr>
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<td>London and of Paris.</td>
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<tr>
<td>French gold coin</td>
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</tr>
<tr>
<td>21 1/2 carats fine,</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<tr>
<td>cast, Hammered</td>
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<td>9.8227</td>
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<tr>
<td>Copper cast</td>
<td>8.7880</td>
</tr>
<tr>
<td>Wire</td>
<td>8.8754</td>
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<tr>
<td>Brass, cast</td>
<td>8.3918</td>
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<tr>
<td>Wire</td>
<td>8.5441</td>
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<tr>
<td>Cohalt, cast</td>
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<tr>
<td>Nickel, cast</td>
<td>7.8570</td>
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<tr>
<td>Iron, cast</td>
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<tr>
<td>Steel, hard, not</td>
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<tr>
<td>screwed</td>
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<tr>
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<tr>
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<tr>
<td>Haematite</td>
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</tr>
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<td>Tin, cast</td>
<td>4.20</td>
</tr>
<tr>
<td>Screwed</td>
<td>4.20</td>
</tr>
<tr>
<td>Zinc, cast</td>
<td>7.2914</td>
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<tr>
<td>Antimony, cast</td>
<td>7.2914</td>
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<tr>
<td>Glass of antimony</td>
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<tr>
<td>Crude antimony</td>
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<tr>
<td>Tungsten</td>
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<tr>
<td>Arsenic, cast</td>
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</tr>
<tr>
<td>Molybdena</td>
<td>6.6665</td>
</tr>
<tr>
<td>Ponderous spar</td>
<td>5.7633</td>
</tr>
<tr>
<td>Jargon of Ceylon</td>
<td>4.7385</td>
</tr>
<tr>
<td>Oriental ruby</td>
<td>4.4300</td>
</tr>
<tr>
<td>Spinelle ruby</td>
<td>4.4156</td>
</tr>
<tr>
<td>Balsas ruby</td>
<td>4.2833</td>
</tr>
<tr>
<td>Brazilian ruby</td>
<td>3.7600</td>
</tr>
<tr>
<td>Pseudotopaz</td>
<td>3.6458</td>
</tr>
<tr>
<td>Bohemian garnet</td>
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</tr>
<tr>
<td>Syrian garnet</td>
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<td>Saffire of Puy</td>
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<tr>
<td>Oriental sapphire</td>
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<td>Sapphire of Brazil</td>
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<tr>
<td>Oriental topaz</td>
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<td>Saxox topaz</td>
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<td>Brazilian topaz</td>
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<td>Emery</td>
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</tr>
<tr>
<td>Hyacinth</td>
<td>3.5365</td>
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<tr>
<td></td>
<td>4.02</td>
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<td>5.6873</td>
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### Gravity.

<table>
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<tr>
<th>Substance</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric air</td>
<td>1.000</td>
</tr>
<tr>
<td>Nitrogen gas</td>
<td>0.985</td>
</tr>
<tr>
<td>Ammoniacal gas</td>
<td>0.600</td>
</tr>
<tr>
<td>Hydrogen gas</td>
<td>0.084</td>
</tr>
<tr>
<td><strong>Vegetable Extracts</strong></td>
<td></td>
</tr>
<tr>
<td>Crystals of tartar</td>
<td>1.850</td>
</tr>
<tr>
<td>Extract of liquorice</td>
<td>1.7228</td>
</tr>
<tr>
<td>Opopanax</td>
<td>1.6226</td>
</tr>
<tr>
<td>White sugar</td>
<td>1.666</td>
</tr>
<tr>
<td>Solution of potash</td>
<td>1.570</td>
</tr>
<tr>
<td>Gum arabic</td>
<td>1.4523</td>
</tr>
<tr>
<td>Honey</td>
<td>1.450</td>
</tr>
<tr>
<td>Catechu</td>
<td>1.3930</td>
</tr>
<tr>
<td>Aloe, ficotrione</td>
<td>1.3795</td>
</tr>
<tr>
<td>Aloe, hepatic</td>
<td>1.3586</td>
</tr>
<tr>
<td>Beddilium</td>
<td>1.3717</td>
</tr>
<tr>
<td>Myrrh</td>
<td>1.3600</td>
</tr>
<tr>
<td>Pomegranate tree</td>
<td>1.3549</td>
</tr>
<tr>
<td>Cocoa shell</td>
<td>1.345</td>
</tr>
<tr>
<td>Opium</td>
<td>1.3366</td>
</tr>
<tr>
<td>Lignum vitae</td>
<td>1.3330</td>
</tr>
<tr>
<td>Box, Dutch</td>
<td>1.328</td>
</tr>
<tr>
<td>French</td>
<td>1.912</td>
</tr>
<tr>
<td>Affatida</td>
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<tr>
<td>Tragacanth</td>
<td>1.3161</td>
</tr>
<tr>
<td>Ivy gum</td>
<td>1.2948</td>
</tr>
<tr>
<td>Scammony, from Smyrna</td>
<td>1.2743</td>
</tr>
<tr>
<td>Aleppo</td>
<td>1.2684</td>
</tr>
<tr>
<td>Myrrh</td>
<td>1.250</td>
</tr>
<tr>
<td>Guaiacum</td>
<td>1.2299</td>
</tr>
<tr>
<td>Gum benjamin</td>
<td>1.2197</td>
</tr>
<tr>
<td>Jacquin</td>
<td>1.2185</td>
</tr>
<tr>
<td>Rhus of Jalap</td>
<td>1.2181</td>
</tr>
<tr>
<td>Galbanum</td>
<td>1.2120</td>
</tr>
<tr>
<td>Gum ammoniac</td>
<td>1.2071</td>
</tr>
<tr>
<td>Dragon's blood</td>
<td>1.2045</td>
</tr>
<tr>
<td>Sagopenum</td>
<td>1.2008</td>
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<tr>
<td>Lignum nephricum</td>
<td>1.200</td>
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<tr>
<td>Ebony</td>
<td>1.177</td>
</tr>
<tr>
<td>Obbanum</td>
<td>1.1732</td>
</tr>
<tr>
<td>Heart of oak, 60 years old</td>
<td>1.1700</td>
</tr>
<tr>
<td>Dry oak</td>
<td>0.932</td>
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<tr>
<td>Pitch</td>
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</tr>
<tr>
<td>Copal, opaque</td>
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</tr>
<tr>
<td>Translucent</td>
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</tr>
<tr>
<td>Euphorbium</td>
<td>1.1244</td>
</tr>
<tr>
<td>Saffron</td>
<td>1.1096</td>
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<tr>
<td>Oil of alfalfa</td>
<td>1.094</td>
</tr>
<tr>
<td>Benzoin</td>
<td>1.0924</td>
</tr>
<tr>
<td>Saffron</td>
<td>1.0970</td>
</tr>
<tr>
<td>Yellow amber</td>
<td>1.0732</td>
</tr>
<tr>
<td>Mastic</td>
<td>1.0727</td>
</tr>
<tr>
<td>Yellow resin</td>
<td>1.071</td>
</tr>
<tr>
<td>Frankincense</td>
<td>1.0613</td>
</tr>
<tr>
<td>Mahogany</td>
<td>1.0626</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>1.0439</td>
</tr>
<tr>
<td>Oil of cinnamon</td>
<td>1.0426</td>
</tr>
<tr>
<td>Anise, occidental</td>
<td>1.0284</td>
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<tr>
<td>Oriental</td>
<td>1.0382</td>
</tr>
<tr>
<td>Malmsey Mica</td>
<td>1.0363</td>
</tr>
<tr>
<td>Oil of cloves</td>
<td>1.034</td>
</tr>
<tr>
<td>Gah nuts</td>
<td>1.0152</td>
</tr>
<tr>
<td>Elemi</td>
<td>1.0181</td>
</tr>
<tr>
<td>Cypri</td>
<td>1.0095</td>
</tr>
<tr>
<td>Distilled vinegar</td>
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<tr>
<td>Water at 60</td>
<td></td>
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### Liquids.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphuric acid</td>
<td>1.8409</td>
</tr>
<tr>
<td>Nitric acid, Ph. Lond.</td>
<td>1.850</td>
</tr>
<tr>
<td>Nitric acid</td>
<td>1.550</td>
</tr>
<tr>
<td>Solution of salt</td>
<td>1.2175</td>
</tr>
<tr>
<td>Water 27, ft 10</td>
<td>1.244</td>
</tr>
<tr>
<td>Water 3, ft 1</td>
<td>1.240</td>
</tr>
<tr>
<td>Water 12, ft 1</td>
<td>1.217</td>
</tr>
<tr>
<td>Water of the Dead Sea</td>
<td>1.060</td>
</tr>
<tr>
<td>Sea water</td>
<td>1.200</td>
</tr>
<tr>
<td>Solution of caustic soda</td>
<td>1.1940</td>
</tr>
<tr>
<td>Muriatic acid</td>
<td>1.0015</td>
</tr>
<tr>
<td>Water of the Seine, filtered</td>
<td>0.708</td>
</tr>
</tbody>
</table>

### Solids.

<table>
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<tr>
<th>Substance</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid of lead</td>
<td>2.700</td>
</tr>
<tr>
<td>Tartarite of antimony</td>
<td>2.100</td>
</tr>
<tr>
<td>Muriatite of ammonia</td>
<td>1.40</td>
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</table>

### Liquids.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphuric ether</td>
<td>.7304</td>
</tr>
<tr>
<td>Nitric ether</td>
<td>.9688</td>
</tr>
<tr>
<td>Muriatic ether</td>
<td>.7298</td>
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### Elastic Fluids.

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<tbody>
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<td>Kirwan</td>
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</tr>
<tr>
<td>Lavoisier</td>
<td></td>
</tr>
<tr>
<td>Barometer 30°</td>
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</tr>
<tr>
<td>Thermom. 52°</td>
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</tr>
<tr>
<td>Sulphurous acid gas</td>
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</tr>
<tr>
<td>Carbonic acid gas</td>
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</tr>
<tr>
<td>Nitrous gas</td>
<td>1.194</td>
</tr>
<tr>
<td>Hepatic gas</td>
<td>1.106</td>
</tr>
<tr>
<td>Oxygen gas</td>
<td>1.103</td>
</tr>
<tr>
<td>Substance</td>
<td>Weight of Alcohol in 100 Pounds of Water at 30°</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Bourdeaux wine</td>
<td>-</td>
</tr>
<tr>
<td>Burgundy wine</td>
<td>-</td>
</tr>
<tr>
<td>Liquid turpentine</td>
<td>-</td>
</tr>
<tr>
<td>Camphor</td>
<td>-</td>
</tr>
<tr>
<td>Oil of mint</td>
<td>-</td>
</tr>
<tr>
<td>Oil of nutmeg</td>
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</tr>
<tr>
<td>Medlar tree</td>
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</tr>
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<td>Linseed oil</td>
<td>-</td>
</tr>
<tr>
<td>Oil of caraway</td>
<td>-</td>
</tr>
<tr>
<td>Oil of marjoram</td>
<td>-</td>
</tr>
<tr>
<td>Oil of spikenut</td>
<td>-</td>
</tr>
<tr>
<td>Oil of roemary</td>
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<tr>
<td>Elaftic gum</td>
<td>-</td>
</tr>
<tr>
<td>Oil of poppy seed</td>
<td>-</td>
</tr>
<tr>
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**GRAVITY.**

Extract from Mr. Gilpin's Table; Phil. Trans. 1794.
GRA

Wax, yellow
Lard
Spermaceti
Butter
Tallow
Fat of hogs of seal
of mutton
of beef
Ambergrease
Lamp oil
Solution of pure ammonia

Gravity, in Mechanics, denotes the conatus or tendency of bodies towards the centre of the earth.

That part of mechanics which considers the motion of bodies arising from gravity, is peculiarly called Statics.

Gravity, in this view, is distinguished into absolute, and relative.

The former is that with which a body descends freely through an unresisting medium: the laws of which see under DESCENT of bodies, ACCELERATION, MOTION, INCLINED PLANE, &c.

The latter is that with which a body descends after having spent part of its weight in overcoming some resistance. Such is that with which a body descends along an inclined plane, where some part is employed in overcoming the resistance, or friction of the plane. The laws of relative gravity, see under INCLINED PLANE, DESCENT, FLUID, RESISTANCE, &c.

Gravity, Centre of. See CENTER of gravity.
Gravity, Diameter of. See DIAMETER of gravity.
Gravity, Paracentric acceleration. See PARACENTRIC.
Gravity, Plane of. See PLANE of gravity.
Gravity, Retardation from. See RETARDATION.
Gravity of the air. See WEIGHT of the Air, AIR and ATMOSPHERE.

Gravity, in Music, is an affection of sound by which it becomes denominated grave, low, or flat.

Gravity stands in opposition to acuteness, which is that affection of sound by which it is denominated acute, sharp, or high.

The relation of gravity and acuteness, is the principal property on which music depends, and it is the distinct, fixed, and determinate quality of this relation which entitles founds to the denomination of 'equable, harmonical or musical.'

Gravity is, therefore, that modification of sound by which it is considered as grave or low, with respect to, or compared with, other sounds, that are acute or high. See ACUTE.

The degrees of gravity, &c. depend on the nature of the sonorous body itself, and the particular figure and quantity thereof: though, in some cases, they likewise depend on the part of the body where it is struck. Thus, e.g., the founds of two bells of different metals, and the same shape and dimensions, being struck in the same place, will differ as to acuteness and gravity; and two bells of the same metal will differ in acuteness, if they differ in shape or magnitude, or be struck in different parts.

So in chords, all other things being equal, if they differ either in matter, or dimension, or tension, they will also differ in gravity.

Thus again, the found of a piece of gold is much graver than that of a piece of silver of the same shape and dimensions; and in this case the tones are, ceteris paribus, proportional to the specific gravities: so a fold sphere of brass, two feet in diameter, will sound graver than another of one foot diameter; and here the tones are proportional to the quantities of matter, or the absolute weights.

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But it must be observed, that acuteness and gravity, as also loudness and lowness, are but relative things. We commonly call a found grave and loud, in respect to another which is grave, or low with respect to the former; so that the same found may be both grave and acute, and also loud and low, in different comparisons.

The degrees of acuteness and gravity make the different tones or tunes, of voices, or found; so we say one found is in tune with another, when they are in the same degree of gravity.

The immediate cause or means of this diversity of tones lies very deep. Mathematicians express the proportion of found to found, by the ratio of numbers. The moderns fix it on the different velocity of the vibrations of the sonorous body: in which Sense gravity may be defined, a relative property of found, which, with respect to some other, is the effect of a lesser number of vibrations accomplished in the same time, or of vibrations of a longer duration. In which sense also, acuteness is the effect of a greater number of vibrations, or vibrations of a shorter duration.

If the vibrations be isochronous, the found is called musical, and is said to continue at the same pitch. See CHORD AND STRING, in Music.

If two or more founds be compared in the relation of gravity, &c. they are either equal, or unequal, in the degree of tension. Such as are equal, or produced by isochronous vibrations, are called unison.

The unequal, including, as it were, a distance between each other, constitute that we call an interval in music; which is properly the difference, in point of gravity, between two founds.

Upon this inequality, or difference, does the whole effect depend; and in respect of this it is, that these intervals are divided into concords and disconcord. See HARMONICS AND RATIO.

As the gravity of founds depends on the thickness, length, and tension, of the strings, or on the length and diameter of the pipes, and, in general, on the volume or mass of the sonorous bodies; the increase of any of these qualities (except tension) augments the gravity of found. But there is no absolute point of gravity in nature, and no found is grave or acute, but by comparison.

GRAULKET, in Geography, a town of France, in the department of the Tarn, and chief place of a canton, in the district of Lavaur; nine miles N.E. of Lavaur. The place contains 1,119, and the canton 7159 inhabitants, on a territory of 185,519 square, in fix communes.

GRAUN, Charles Henry, in Biography, chapelmaster to Frederick II, the late king of Prussia, was the favourite composer of that prince, from 1732 to the time of his decease, in 1759. On the accession of the prince of Prussia to the throne in 1740, his majesty, having determined to have an Italian lyric theatre in his capital, sent Graun to Italy to study the Italian language and taste in music, and to engage vocal performers. Graun remained two years in Italy, during which time the king, his royal master, had constructed, in spite of the Silevian war, one of the most magnificent, complete, and convenient theatres in Europe, for which Graun was the composer to the end of his life; and even after his decease little music but of his composition was ever performed in it for a long time.

The works of this master are very numerous: before his arrival at Berlin, he set three or four operas in the German language at Brunswick, but the words were bad, and it is not fair to judge of his genius by those early productions. He composed for the Berlin theatre, in the space of fourteen years, from 1742 to 1756, twenty-seven Italian operas; and
and for the church; a Te Deum, and a Paeifone, besides miscellaneous productions of less importance, as odes and cantatas, with the overture and recitatives of the pastoral opera of Galatea, of which his majesty, Quantz, and Nichelmus, set the fongs.

On the decease of this excellent composer, innumerable poems and panegyrics were written to his memory. Among the "Critical Letters concerning Music," published by M. Marpurg, there is an address to M. Fried. Wilhelm Zachari, the celebrated poet and musician of Brunswick, recommending the death of Graun to his muse. No great stress can be laid on panegyrics; however, there are few of Grauns admirers, who are not ready to burn with fire and faggot all those who dare to doubt of this author's veracity.

"Graun, the brightest ornament of the German muse, the noble master of sweet melody, is now no more! creator of his own taste, he spoke not, but to our hearts; tender, soft, compassionate, elevated, pompous, and terrible, by turns—he could force tears of admiration from us, at his pleasure; an artist, who made no other use of art, than to imitate nature, in the most pleasing and expressive manner; each stroke of his pencil was equally perfect, full of invention, and of new ideas, his genius was inexhaustible. The model of sacred music, and in the theatre inimitable! a man who commanded our affections, not only by his talents, but by his virtues, of friendship, probity, and patriotism; no man was ever so universally lamented by the whole nation, from the king, to the lowest of his subjects."  


Now, to reverie the medal; it is denied, by the other party, that Graun was the creator of his own taste, which is the taste of Vinc; they deny, that he is ever pompous or terrible, but say, that an even tenor runs through all his works, which never reach the fullline, though the tender and graceful are frequently found in them; they are equally unwilling to subscribe to his great invention, or the originality of his ideas; and think that full more perfect models of sacred music may be found in the choruses of Handel, and the airs and duos of Pergolesi and Jomelli: nor can they well comprehend, how that composer can be called inimitable, who is himself an imitator.

We have recently examined the scores of Graun's operas, and fee no reason for changing the opinion which we formed 30 years ago. He was certainly a great master, elegant in his melodies, and correct and regular in his harmony; but if any one of his operas were now to be revised, it would be thought in want of variety and fire.

During the life of his great and ill-fated patron, he was revered as much at Berlin as Handel in England; both great men, most affable; but much discrimination is necessary in drawing a parallel between them. Handel formed his style on the best models of the old school, at the time of its greatest perfection; such as Geminiani, Colono, Alceg. Scarlatti, Stenerson, and Corelli: Graun on that of the inventor of the new style, Vinci; who, though extremely and justly admired for the grace and elegance of his melodies, the simplicity of his accompagnement, and the facility and elegance of his style in general, has been far surpassed by Pergolesi, Jomelli, Piccini, Sacchini, and Pachelbel. German is perhaps more obliged to Graun for smoothing, simplifying, and polishing the coarse, laboured, and indecent style of their old masters, than to any Italians that have been employed at the imperial court or at Dresden, to set the dramas of Apollonio Zeno and Metastasio. Handel had more spirit and invention, and Graun more polish and refinement. Handel was wholly unrivalled in the country where he spent the greatest part of his life; but Graun had a rival in the Roman Catholic courts, in the celebrated Haffi, his countryman, whose compositions were as much in circulation and favour all over Europe, as those of Vinci and Per- golesi. Those of Graun seem wholly confined to Germany, and almost to the court of Berlin; nor do we ever remember to have heard Mara sing one of his airs in England, though during many years he performed the principal female parts in his operas at Berlin. His Te Deum was first appointed to be performed at the concert of ancient music in 1758, by the late duke of Leeds, then marquis of Caernarthen, and it has continued a fock piece ever since. Many of his duets, and his Eob Requiem are admirable compositions, and it certainly deserves to be ranked very high among the great masters of the last century.

GRAUN, John Cottolin, brother of the above composer, and concert-mafer to his late Prussian majesty, Frederick II. His admirers at Berlin, say that "he was one of the greatest performers on the violin of his time, and most assuredly, a composer of the first rank; his overtures and symphonies are majestic, and his concertos are master-pieces, particularly those for two violins, in which he has united the most agreeable melody with all the learning that the art of counterpoint can boast; he has likewise frequently set the Salve Regina, and composed masses, which are rendered grand and noble by simplicity and good melody, even in the most laboured parts."

But less quarter is granted to this master, by the admirers of more modern music, than to his brother; they often find his overtures and symphonies too like those of Lulli, and too full of notes to produce any other effect, when played at Berlin, than that of lulling the hearers: and in his concertos and church music, when that is not the cafe, the length of each movement is more immoderate, than Christian patience can endure.

Perhaps the truth may lie between these two opinions; and with respect to the chapel-mafer Graun, it should be remembered, that he was seldom allowed to follow the bent of his own genius.

GRAUNT, John, born April 23, 1662, was brought up to the trade of a haberdasher, but by his good fortune and integrity in business he acquired the esteem of his fellow citizens, so as to be elected into the common council of the city of London. The bills of mortality, which were annually laid before this body, led Mr. Graunt to turn his attention to the science of political arithmetic. From very small beginnings he collected a large body of materials, from which he composed a work entitled "Natural and Political Observations made upon the Bills of Mortality." This work was well received by the public, and passed through several editions; it obtained likewise for the author an admission into the Royal Society, upon the particular recommendation of the king, who gave it in particular charge to those concerned, that if they found any more such tracts, they should be sure to admit them. It is generally supposed that Mr. Graunt received valuable assistance from Sir W. Petty; but the style is such as might be expected from a plain citizen, and the tabular form, presenting at one view the general results of a number of important facts, was a thought essentially leading to all the conclusions which have since been established relative to these subjects. After his retiration from business, he was admitted a trustee for Sir William Hackhouse, into the management of the New River Company, which, with the unlucky circumstance of his being a convert to popery, gave occasion to the groundless calumny of his having had a hand in the great fire of London.
At length he retired from the University for a time. His studies were pursued in a hermitage, and in the interval between his periods of residence at Cambridge, he had maintained a correspondence with his friends. He was a great admirer of Pope, and his letters are full of eulogy on his genius and accomplish-ments. His first publication was a collection of poems, which he dedicated to the Duke of Ormond, and this was followed by a collection of odes and elegies, which he dedicated to the Duke of Devonshire. His next work was a collection of poems and essays, which he dedicated to the Duke of Richmond. These works were followed by a collection of essays and poems, which he dedicated to the Duke of York. His last work was a collection of poems and essays, which he dedicated to the Duke of Marlborough. These works were followed by a collection of poems and essays, which he dedicated to the Duke of Richmond. His last work was a collection of poems and essays, which he dedicated to the Duke of York. His last work was a collection of poems and essays, which he dedicated to the Duke of Marlborough. He died at the age of 84, in 1734.

Gray, Thomas, in Biography, a distinguished English poet, descended from very respectable citizens of London, was born in Corsiliil, December the 26th, 1716. His grandfather was a considerable merchant; but his father, Mr. Philip Gray, was of an indolent and refractory temper; and therefore dissatisfied rather than increasing his paternal fortune. He had many children, of whom Thomas, the subject of these memoirs, was the fifth; all of them except himself died in their infancy, and he is said to have narrowly escaped suffocating, owing to a too great fulness of blood, which destroyed the rest, and he would certainly have been cut off as early, had not his mother, with a courage remarkable for one of her sex, ventured to open a vein with her own hand, which instantly removed the paxyoxin. He was probably destined for a profession, and accordingly sent to Eton school to acquire the fundamental stock of classical literature. Here he was placed under the immediate care of Mr. Anstruther, his mother's brother, at that time one of the ablest masters, and likewise a fellow of St. Peter's college, Cambridge, to which place Mr. Gray removed, and was admitted a pensioner in the year 1734. Of his residence at Cambridge few memorials are recorded; he seems rather to have cultivated a literary taste in silence, than to have had any aim at public distinction. He never gives any account of the university congratulators of the prince of Wales's marriage, and his verses were admitted to be the chief of the academical collection. His letters, during this period, to Mr. Well, which are printed by Mr. Maffon, show that he had little reverence for the graver studies, or for the dignified periphrases of the place, and that he had acquired that exaltedand profound sense which was the permanent feature in his character. He quitted college in 1738, and occupied a seat of chambers in the Inner Temple, with the avowed intention of studying the law. A Latin ode, addressed upon this occasion to Mr. Well, who had the same purpose in view, exhibits in a striking manner the ascendency which the poet possessed in his mind over the ideal lawyer; and on the invitation which Mr. Walpole gave him to be the companion of his travels, he had an offer of this intention, and never after refused it. They set out in the spring, and his letters from the different stages of his progress, are a proof of the intelligent curiosity with which he viewed the striking objects of art and nature, and the manners and habits of mankind. Thus, in his letter from

Amiens, he describes everything that he saw on the road, paints in vivid colours what was remarkable in the several towns through which he passed; and he adds, that "on every hillock is a windmill, a crucifix, or a Virgin Mary dressed in flowers, and a fort et robe; one sees not many people or carriages on the road; now and then a trotting friar, a countryman with a great muff, or a woman riding astride on a little ass, with short petticoats, and a great head-dress of blue wool." They travelled through France, crossed the Alps, visited the principal towns of Italy as far as Pisa, returned to Rome, and in the spring of 1741 proceeded to Venice. Upon their way these two companions fell into a disagreement, which occasioned their separation. Of this unfortunate incident the biographer says, "Mr. Walpole enjoins me to charge himself with the chief blame in their quarrel; confessing that more attention and complaisance, more deference to a warm friend, superior judgment and prudence, might have prevented a rupture that gave much uneasiness to both, and a lasting concern to the survivor; though, in the year 1744, a reconciliation was effected between them." Mr. Gray, with his own very moderate resources, finished the rest of the tour, and arrived in England in September 1741, two months previously to the death of his father. He now returned to academic retirement at Cambridge. In the following year he had the misfortune to lose his friend Mr. Well, the confident of his sentiments and partner of his studies. The death of this hopeful young man left a vacancy in Mr. Gray's heart, which was never after filled. He had an ambition to excel in Latin poetry, but was convinced that nothing could only be acquired by works according to the general taste of his countrymen. He made many noble beginnings of poems, which, if he had possessed perseverance enough to have completed them, would have returned to his immortal honour. In the year 1742, he took the degree of bachelor of civil law, a circumstance which gave him every necessary privilege for improving an university residence, and he set down to a course of reading, which he pursued with the diligence of an exact critic. For several years his exulting learning and high poetic talents were known to but a very few of his most intimate friends. In 1747 he published his "Odes on the distant Prospect of Eton College," and in 1751 his "Elegy written in a Country Church-yard," was sent into the world without the author's name. Few poems were ever so popular; it has passed through an almost indefinite number of editions, and is at this moment one of the most favourite productions of the British muse. It has been translated into Latin and Greek verse. In 1753 Gray buried his mother, to whom he had always been devoted, but with true filial duty and affection, and on her tomb he wrote, "The tender mother of many children, one of whom alone had the misfortune to survive her." At college he was, on account of some peculiarity in his manners, subject to the boisterous tricks of a few riotous young men of fortune, who took a pleasure in disturbing and alarming him; he made remonstrances on the subject to the heads of the house, which not producing the effect which he anticipated, he removed his residence to Pembroke Hall in 1756, and in the succeeding year he was, on the death of Cibber, offered the post of poet laureat, which he declined. His motive for refusing this office could not have been through any doubt of his being adequate to its duties, for in the same year he showed what he was capable of doing as a lyric poet, by the publication of his two principal odes, entitled "On the Progress of Poetry," and "The Bard." It would indeed have been most lamentable, that any of his genius and independent mind should have been fettered by the obli-
gradation of producing periodical exhibitions of court incense. The odours just mentioned were much less popular than the elegy; many could not understand them, some ridiculed them, and in general they were more the objects of abomination than of rapturous feeling; nevertheless, among persons of real literary taste, they raised the author's poetical character to a level with that of the first poets of his country. 

In the year 1759, Mr. Gray varied the uniformity of his life by a residence, which continued three years, in lodgings near the British Museum, chiefly for the purpose of consulting curious books and manuscripts in that great national repository. In 1765, he took a journey into Scotland for his health, was introduced to several eminent literati in that country, and fed his imagination with those scenes of natural sublimity and beauty which no man was better qualified to write, and to improve. He had, previously to this, sought for the professorship of modern history at Cambridge, but either his application was too late, or the patron, Lord Bute, had other interests to serve; it was given to another candidate. A second vacancy occurred in 1768, when it was conferred upon him, unfolicted and unexpected, in the midst, however, of some defects in the former part of his life, as always been capable of doing noble things in a noble manner. The place was worth 1000 per annum. and Gray made a voluntary return for the favour by an "Ode to Madam," for the installation of that nobleman, as chancellor of the university in 1769. His new office laid him under an obligation to forse exertions; he might indeed have sheltered himself by the example of his predecessors, and received the emoluments without paying any regard to its duties, but the idea of retaining a perfect income did not accord with his temper; he immediately set about preparing for active forecoumtry an admirable plan for his inauguration speeches, in which, after enumerating the preparatory and auxiliary studies requisite, as ancient history, geography, chronology, &c. he defended to the authentic sources of the science, such as public treaties, state records, private correspondence of ambassadors, &c. He also drew up and laid before the duke of Grafton, three different schemes for regulating the method of choosing pupils privately to be instructed by him, which were highly approved, and if he had been accustomed, by general habits, to those exercises which he felt would have been beneficial to the improvement of his pupils, much might have been expected from his lectures, but with a mind replete with the stores of knowledge, ancient and modern, he was totally unable, through the handfull effects of habitual literary inattention, to bring his valetudinary to use on demand; and after many uneasy struggles, he proceeded no further than to sketch out a plan. His health was indeed rapidly on the decline; low spirits, "the hideous scholar's familiar malady," seized him; an irregular hereditary grain made more frequent attacks than usual on his feeble constitution; at length a sudden haunch, with which he was affected while dining in the College Hall, indicated that the disease had left the extremities and established itself in the bosom. He died July 30th 1771, in the fifty-sixth year of his age. He was sensible to the lift, and aware, through the whole of the disease, of its great danger, but expressed no visible concern at the thoughts of his approaching dissolution. With a warm imagination, Mr. Gray had cool application, and a calm sedate disposition. He was attentive to economy, yet wholly void of avarice; he was generous, even when his circumstances were the most narrow. He was careful of himself, and to timorous, that it was affected, some of the final views in a tour to the Lakes, etc. But when he did not wish to venture to those spots whence they were to be seen. This want of personal courage is a singular contrivance with the manly and martial strains of his poetry. In morals he was temperate, upright, and a constant friend to virtue. His religious opinions were not known, but he always abhorred the dissemination of scepticism and infidelity. Few men of his reputation have had such vanity, and he bore with good-humour and easy negligence all the criticisms upon his compositions. The learning of our poet was general and deep; it comprised almost every topic of human enquiry, excepting what belonged to the sciences properly so called. As a poet his muse was often devoted to the late potlister, at least, as long as there is taste enough left to feel and enjoy elegant writing. No one appears to have possessed more of that faculty of poetical perception which distinguishes among all the objects of art and nature what are fittest for the poet's use, together with the power of displaying them in their richest colours. According to a critic, Mr. Gray "did not excel in pure invention, neither is he highly pathetic or sublime, but he is splendid, lofty, and energetic; generally correct, and richly harmonious. Though lyric poetry is that in which he has chiefly exercised himself, he was capable of varying his manner to suit any species of composition. Perhaps he was best of all qualified for the moral and didactic, if we may judge from his noble fragment of "An Essay on the Alliance of Education and Government." As a writer of Latin verse he is perhaps surpassed by few in classic propriety. His letters are entertaining and instructive, free from all parade; they possess a fund of pleasantry, which will ever render them proper among those of his countrymen and are at all times in accord with the principles of literary taste. By a friend who has described his character it is said that "perhaps he was the most learned man in Europe; he was equally acquainted with the elegant and profound parts of science, and that not superficially but thoroughly. He knew every branch of history both natural and civil, and had read all the original historians of England, France, and Italy; and was a great antiquarian. Criticism, metaphysics, morals, and politics, made a principal part of his plan of study; voyages and travels of all sorts were his favourite amusement, and he had a fine taste in painting, prints, architecture, and gardening; with such a fund of knowledge, his conversation must have been equally instructive and entertaining; but he was also a good man, a well bred man, a man of virtue and humanity. There is no character without some speck, some imperfection; and I think the greatest defect in his, was an affection in delicacy, or rather effeminacy, and a visible fulfulness or contempt and disdain of his inferiority in science. He also had in some degree that weakness which perplexed Voltaire so much in Mr. Congreve; though he seemed to value others chiefly according to the prografs they had made in knowledge, yet he could not bear to be considered himself merely as a man of letters; and though without birth, or fortune, or lineage, his defile was to be looked upon as a private independent gentleman." Madon's Life and Letters of Gray, four vol. 80. 1778. Gray, or Grey, a mixed colour, partaking of the two extremes, black and white. In dyeing, many of the varieties of grey, iron-grey, slate colour, &c. are given by prococies, in general, similar to those for black, but with smaller quantities of the ingredients, and especially a shorter time of immersion. They are often finished with a weak bath of well, cochineal, Brazil-wood, and other livid colours to give some particular tints. In the Blanehe they make several sorts of grays: as the brandished or blackened grey, which has spots quite black, diffused here and there. The fuddled grey, which has spots
of a darker colour than the rest of the body. The light or silver grey, wherein there is but a small mixture of black hairs. The dark or iron grey, which has but a small mixture of white. And the brownish or sandy-coloured grey, where there are bay-coloured hairs mixed with the black.

Gray, in Zoology, a name given in some counties of England to the badger.

Gray is also used in some places for a species of wild-duck, more commonly known by the name of the gadwall.

See Deck.

Gray, in Geography, a town of France, and principal place of a district, in the department of the Upper Saône, seated on the Saône, which is navigable by boats to Lyons, whither the inhabitants fend grain and iron, the chief articles of their commerce. The place contains 5009, and the canton 13,823 inhabitants, on a territory of 213 square kilometres, in 26 communes. N. lat. 47° 27'. E. long. 53° 40'.

Gray, a port-town of America, in Cumberland county and state of Maine; 13 miles N.W. from Portland. The township was incorporated in 1778, and contains 987 inhabitants.

Gray's Bay, a bay on the N. side of the river Columbia, in New Georgia. N. lat. 46° 19'. W. long. 236° 22'.

Gray's Creek, a river of Virginia, which runs into James river. N. lat. 37° 3'. W. long. 76° 56'.

Gray's Harbour, a port or bay on the W. coast of North America, examined and described by Mr. Whitby. The surrounding shores are low and apparently swampy, with salt-marshes; the soil is a thin mixture of red and white sand over a bed of stones and pebbles. At a small distance from the water side, the country is covered with wood, chiefly pines of an inferior stature and growth. The number of Indians inhabiting this place were estimated at about 100, they spoke the Nootka language, though it did not seem to be their native tongue, and they appeared to vary in little or no respect from those people occasionally seen. N. lat. 47°. E. long. 236° 27'.

Grayling, or Umbur, the English name for the fish called by authors Thyminius, and Thymius, and by Arctedi a species of corregenous, and the Salmo Thyminius of Linnaeus, which fish, it is believed, is found in the fresh waters and clear rapid streams, chiefly in the mountainous counties of England, and in the like situations in other countries, and is one of the finest kinds of all the fresh-water fishes. It is common in Lapland, where the guts of it are used instead of remet to make cheese, which they get from the milk of the reindeer. It is a voracious fish, rises freely to the fly, and will very eagerly take a bait. It feeds on worms, and spawn in May.

Grayson, in Geography, a county of Virginia in the upper waters of the Great Kanawha. It contains 3742 square miles, and 170 villages. Its form is trapezoidal, the longest line being about 50 miles, and its greatest breadth 15 miles. It is mountainous, abounding with timber and iron ore; and two large iron-works are erected in it. About a fifth part is arable. The town house is in N. lat. 36° 35'. 250 miles S.W. of Richmond.

Grazelma, a town of Spain, about 13 miles from the borders of the province of Granada, built partly on the side, and partly on the top of a mountain. Most of the inhabitants are employed in the manufacture of woollen and cotton cloths, and also of crucibles. Their number is about 3000.

Graziani, Anton-Marie, in Biographie, a bishop and elegant writer, was born of a distinguished family at Borgo-Iu-Sepolcro, in Tuscany, about the year 1571. Having obtained a good knowledge of grammatical learning at Friuli under the celebrated Abolemio, he was sent to Padua to study the law. In 1590 he visited Rome, and was kindly patronized by commendone, afterwards cardinal. He accompanied this friend, between whom and himself there was an unalterable attachment, in all his journeys into Germany and Poland, and refuted to quit him, though solicitud with great promises by Henry of Valois, at that time king of the latter country. After the death of commendone in 1584, he was made secretary to pope Sixtus V., and took a considerable share in the election of Clement VIII., who, in 1592, in gratitude for his services, created him bishop of Amelia, and sent him as his munici to the Italian princes and states, in order to unite them in a league against the Turks. When at Venice, he prevailed that republic from declaring in favour of Cesar d'Este after the demise of Alphonso II., duke of Ferrara. In 1598 he retired to his see, where he remained, till his death in 1615, and abundantly employed in the duties of his high office.

As an author Graziani is known by the following works: "De Bello Cyprioe," lib. v. 410. 1624; "A History of the War of Cyprus;" "De Vita Commendonii, Cardinalis," which was intended as a tribute of gratitude and affection to his deceased friend and patron; "De Canibus adversis Vcruum illustribus," and a collection of synodal ordinances.

In 1734 the public were presented with a curious posthumous work of this author, entitled "De Scriptis Invitis Minervae, ad Aloysium Fratrem," lib. xx. in which he not only gives an account of his own life and writings, but that of his native town and family; of his brother's travels, and of the public affairs in which he was engaged.

Morei.

Graziano, D. Bonafico di Marino, maestro di cappella of the Jesuits' chapel and seminary at Rome, was a very voluminous composer of sacred music and cantatas, who flourished from the year 1650 to 1678. Padre Martini has given the following list of his ecclesiastical publications: three books of psalms for five voices, a due cori, or for two choirs; published at Rome 1652 and 1670. Masses at 5 Rome, 1671. Six books of motets, for 4, 3, 4, 5, and 6 voices, Rome, 1655. Responsoria della Settimana, Rome, 1663. Litaneias for 3, 4, 5, and 8 voices, Rome 1675. Sacred and moral compositions, for 1, 2, 3, and 4 voices, 1678. Of his cantatas, though none are mentioned in this list, yet the number of them, that have been preserved in MSS. collections of old music, is equal to those of Carilliini, Cesti, and Luigi Roffi, particularly in the British Museum; Dr. Aldridge's collection of music in the library of Chrift-church, Oxford; Dr. Burney's Collect. &c.

Grazieri, in Agriculture, a term commonly applied to such farmers as are engaged in the art and busines of fattening various sorts of live stock on paste and other grains. That this sort of business may be managed to the best possible advantage, the grazier should have a perfect knowledge of the nature, properties, and value of all sorts of cattle and sheep flock, as well as of the quality of the ground on which they are to be fed, and of the best proper methods of fating them to each other. And he should also be well informed concerning the nature and states of markets in general. It is obvious that upon these being well understood and properly regulated, much of the success of this sort of farming busines must depend; as thereby proper advantage may be taken, not only of fairs and markets, but a variety of other necessa rу circumstances.
The markets for the sale of fat stock, especially those of the next cattle and sheep kinds, are generally as high about the end of April as at any other period of the year, in consequence of the supply, at that season of the year, being only had from cured or corn-fed animals, not one farmer in a thousand having any of their winter green food remaining. On this account such beasts or sheep as are really fat at that time are sure to fetch a good price in the markets, and particularly at Smithfield. With the latter animals, however, the less, in some instances, it is rather different as to those farmers who are good providers: spring food is now beginning to be ready, though seldom in such plenty, from the number of bad managers, as to reduce the markets in any great degree. 

The inexperienced grazer should consequently fully weigh and consider the different modes in which he may be able to dispose of his fat stock to the greatest advantage. The first and principal place to which his attention will be directed, will probably be Smithfield market, especially for the more southern graziers. If he be situated in a district that is divided into small or middling fixed farms, and in which the farmers are not commonly in the regular practice of employing discount drovers, in whom proper confidence can be placed, be will of necessity be as safe as his neighbours, and may not have reason for any particular caution.

The mode is very common in the eastern part of the county of Norfolk. Where he occupies a very large farm, whatever the nature of it may be, whether an arable grazing one, as is customary in West Norfolk, or a grafs grazing one, as in the county of Lincoln, on a scale that enables him to tend many droves in a pretty regular manner to his fullman, he may safely trust to him; as the usual confidence and integrity of trade mostly take place in such cafes. But it must be observed, that it is seldom the cafe that the grazer who feeds occasionally or accidently a lot of fat beasts or sheep to Smithfield market, gets as fair a price for them as his great neighbour, who is in constant dealing, gets the same day, or his little one, whose flock took the same chance through the means of a confidential drover. The person who thus drops in a lot, out of the regular course of his business, is scarcely ever satisfied with the treatment he meets. And there is, without doubt, much truth in the remark, in consequence of the frequency of its being made by persons from different places.

On the other hand the inexperienced grazer should consider the circumstances well, and try the country butchers, in order to feel his way through the difficulty as well as he can, provided his farm be of such a size, and in such a situation, as to lay him open to its influence and effects.

In the case of grazing, great advantage may be derived, by those who have not had much experience, from the frequent weighing of the animals while alive; as by a comparison of the living with the dead weight, in such cafes, as when they are killed in their own neighbourhoods, they may soon become able to judge, with a tolerable degree of correctness, of the dead weight of any common fixed beast, of which they have ascertained the weight while in the living state. And where the living weight has been taken from tables of admeasurement, such as those composed of B wor, they may compare the result in a pretty exact way.

The work of ascertaining the living weight in sheep, calves, hogs, and other similar kinds of animals, may be effected in a simple and easy manner, merely by the contrivance of a sort of cage or large covered bulb, with a door at each end for their reception and discharges, to which is attached a pair of large flaxyards, so as to show the weight.

The frequent weighing of the fattening flock shews the grazer the different degrees of progress which the animals have made in different periods and situations, as well as what the effects of different sorts of food are upon them; what changes may be necessary in it, and when it may be the most proper to sell, provided the markets should be suitable. In short, a fort of confidence is in this way gained by the grazer, that could not be readily acquired in any other manner.

But affluence of this nature is not by any means necessary for such graziers as have been long accustomed to the handling and judging of the weights of animals, as they can in general form tolerably correct opinions by the eye and the feel, in consequence of such long experience; though it not unfrequently happens that they are deceived, the beasts turning much better and heavier than they had imagined. It has, indeed, been remarked that, let the grazer be as experienced as he may in buying and selling, as well as in judging by the hand and the eye, the butcher will beat him, from having been able to bring the live to the left of the dead weight, in such a variety of different instances, as must render his judgment perfect. The grazer, though he cannot therefore equal him, may, in a great measure, approximate to him by means of frequent careful weighing of the living animals.

It must of course appear evident that it is a matter of great consequence for the flock farmer, to make himself, as soon as possible, perfectly conversant with this part of his business, as without it he must be liable to be greatly deceived in his dealings.

GRAZING, the practice of feeding and pasturing down grazls-lands with different sorts of live stock, with the intention of improving and rendering them fit for the market. It is a fort of management that cannot be carried on to much advantage, except in those districts where the quantity of pasture land is considerable, and of a suitable quality for the purpose, or where the value of the produce of such land is but small in comparison with the flock which is fed upon.

There are particular districts in different parts of the kingdom that are much more in this system of farming than others, as is exemplified by those of the counties of Lincoln and Leicester, in the middle part of the island, Someret, Gloucester, &c. in the west, and Romney warth, &c. in the south.

But there are tracts of grazing ground of more or less extent in most of the counties of the kingdom.

It is well remarked that there are certain situations as well as descriptions of pasture ground on which this method of farming may be had recourse to with better profits, and more success than that of any branch of the dairying system. This must be the case in all those districts where the proportion of land in the state of tillage is very small in comparison to that of the pasture kind, consequently the price of produce of the grass fortrilling in comparison to that of the fat stock. In all such districts of the kingdom where the grazls-lands are of so fine and rich a quality, as to be capable of fattening large bullocks or other cattle, this system may be had recourse to with much success and profit, and is perhaps the best application to which the lands can be applied, as is fully shown by such districts being mostly under some management or other of this nature.

It may be observed that the art of grazing to advantage depends upon a variety of circumstances, such as those of the nature and quality of the grounds, the propriety of the management of them in respect to feeding down, changing, and shuffling them up; the properly adapting the flock to them.
them in quantity, size, and quality; the judgment of the grazier not only in feeding such as are most suitable for the purpose and most disposed to fatten, but in obtaining them, where they are to be purchased, at such prices as that they may pay well for keeping; and disposing of them, when fattened, at their full value and advantage.

It has been stated, by Mr. Kent, that the flocking of land with proper cattle is one of the nicest parts of the science of farming. Where nature is left to herself, she always produces animals suitable to her vegetation, from the smallest sheep on the Welsh mountains to the largest horned ox in the richest pastures in Somerfithur. But good husbandry admits of our increasing the value of the one in proportion to that of the other. Land improved enables us to keep a better flock of stock, which thaws the double return the earth makes for any judicious attention or labour we bestow upon it. The true wisdom of the occupier is best shown in preserving a due equilibrium between this improvement of his land and stock. They go hand in hand, and if he neglect the one, he cannot avail himself of the other. It should, therefore, be first considered what kind of cattle, or other sorts of stock, will answer the purpose best, on the particular description of land upon which they are to be grazed; and next, what sorts may pay the most in the consumption of the produce.

In general, it will probably be found, that upon strong florid pastures of the drier kinds, the large sorts of cattle, with some of the larger breeds of sheep, will be the most suitable stock; but that where the grasslands are neither so luxuriant nor so dry, and upon turnip-lands, the small English, Welsh, or Scotch cattle, with some of the small breeds of sheep, will be most profitable. Thus, as different sorts of grassland and different kinds of produce feed in point of profit to require different descriptions of animals to feed upon and confine their produce, it is of much importance to be at some pains to make the best and most suitable application. And in cases where the grazier breeds his own flock, he will have little difficulty in feeding such of the different kinds as are the most adapted to his views; but where the animals are to be purchased in, which must most frequently be the case, more care and circumspection will be necessary. It will be proper, though a difficult task, to make a choice of such as have been well kept and are in a thriving condition; as when they have been limited in their food, and have the contrary appearance, they seldom do so well for the uses of the grazier. It will likewise be of advantage to have them from situations in which the lands are inferior in point of richness. It is noticed by some, that many farmers have found great advantage in buying sheep from the poorer spots, as they generally thrive more when they come into a richer pasture, like trees which endure transplanting the better for coming from a poor nursery. They likewise think that they endure feeding and penning better than sheep which are bred on a more luxuriant soil. And they are certainly right, in these observations. But, with respect to the notion which farmers are apt to entertain, that all kinds of sheep will not endure penning, they labour under an error. It is believed that all lean or floc-shorn are the better for being flocked. They are generally more healthy; and, above all other advantages, this one is certainly obtained by it: when such sheep are put to fatten they thrive much better and fatter, as oxen do that have been moderately worked. But where the grazing-lands are very moist, sheep are not by any means a sort of flock to be depended upon, as they are extremely liable to become diseased.

In addition to these points, it is necessary to have consider-

able regard to the qualities or properties of the kinds of animals, whatever they may be, in the intention of grazing them with profit; those kinds, whether of cattle or sheep, which have the property of keeping themselves fat, or in tolerably full condition, by the least consumption or expenditure of food, being constantly preferred, whatever the size or breed may be, as that is evidently a quality of much greater importance to the grazier than that of mere size, considered in an abstract manner. It is flated, that where there are fine and rich pastures, the grazier may "choose his beasts as large as he can find them, provided they are of the right breed and shape; but let him always prefer shape to size; for it will assuredly pay him better;" and, that "those who are upon indifferent grass must take care to proportion the size of their beasts to the goodness of their pastures; their cattle had much better be too small than too large; as there are vast tracts of land that will answer in grazing, which are not good enough to support large breeds." And it is not improbable, but that the same thing may hold good in a greater degree in regard to sheep. But in all such cases, as where the flock is reared upon the land of the farm, which is often a good practice, there can be little difficulty, as has been seen, in fixing upon such animals as are the most proper in these different situations; but as it must often be necessary for the grazing farmer to purchase his live-stock at fairs and country markets and sells, and, consequently, with a less degree of care and attention, as well as knowledge, will be required for him to accomplish it in the most advantageous manner.

In a fyllem of Practical Agriculture, lately published, it is noticed to be "of great importance in this busines to provide such as have been kept in a proper manner, and are in a healthy, improving state; as, where the contrary is the case, they are difficult, and require much greater length of time to be brought into the slate proper for sale than would otherwise have been necessary. It is, perhaps, experience alone that can qualify the grazier to form a correct judgment in these respects; in general, however, he is led to the choice of stock by no fixed or scientific principles, but by the impression the appearances of the animals have upon him." And, it is stated on the authority of Mr. Marshall, "that the experienced grazier, who has been accustomed to attend fairs and markets, knows at a glance, or by the suffice of the slightest touch, whether the animals he is about to purchase will suit him. Their general form and looks please him. They are easy to work; their hides are fine and thick; their muscles are well formed; their countenances brisk; their skins alive, and their fleece mellow. On the whole, they have the resemblance of those which have been grazed before with success. Others are rejected, from the grazier not having found any such as they referable to have done well, but many to have turned out in an unprofitable manner. And the writer of the above work conceives, that there are certain "principles in this branch of the farmer's business which may be attended to with great advantage, as the animals have certain points or parts, the proper or improper forms of which denote them to be valuable, or the contrary, for this purpose. These are, that the legs should be fluted in proportion to the size of the animal; the back very straight, broad, and flat; the loin wide; the carcass deep round, or rather barrel-shaped below; the fore-quarters round, full, and spreading; the bones small; the flesh adhering an chalky feel; the skin thin, and a disposition to fatten well, and on the belt parts. Where these marks are predominant, the flesh is meltly fit for the purposes of the grazier." And, "that where the hair of the hide, in fattening cattle, is inclined to curl instead of being
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being flanked, they are most disposed to thrive. This has been found to be the case in practice in different parts of the kingdom," as has been shown in various publications on agriculture.

"In lean beaus also, when the hair of the hides is curled, they commonly keep themselves in better condition than where the contrary is the case. In all cases a disposition in the animals, of whatever fort they may be, to wildness, and not remaining quietly in their pastures, forms an inescapable objection in this system of management; as no animal ever fatten, well that has a tendency to ramble: it is quietness, feeding quickly, and lying much, that has the greatest tendency to make them become fat in a short time;" a fact which is fully confirmed by what happens in the new Leicesters or Duleby breed of sheep, which are so tame and quiet as scarcely to move over a common pasture. And, "from the result of actual experiment with four different beaus, in which the least possible difference could not be discovered on the most minute examination, it has been found that too much attention cannot be bestowed in the choice of the breed of fattening flock, as, though they were in every respect the same in appearance, two, from their superior disposition to fatten, were found to afford a profit in the proportion of fifteen shillings the week, while the other two did not yield more than about five shillings and ten-pence." This fact is recorded in the Annals of Agriculture, and clearly shows that too much attention cannot be paid by the grazing farmer to the discovery of this propensity in the flocking of his pasturage, or other grazings.

Notwithstanding it must often happen that the grazer cannot fully avail himself of this, from the impossibility or vast difficulty of procuring such animals, and is consequently under the necessity of buying in such as are more at hand, and ready for his use.

It is the usual custom in Leicestershire, and the neighbouring districts, to have commonly recourse to the improved long-horned breed of cattle, from the animals being bowld to fatten in a ready manner, and to afford good beef. And, in the adjoining county of Lincolnshire, a mixture of the large beaus, of both the long and short-horned breed, are said recourse to as grazing flock, besides those breed in the county, and such as are brought into it by the Scotch drovers.

On the contrary, in Somerfahlshire, the dark-red fort, or Devonshire breed, has been long much in esteem by the graziers, and have lately spread themselves much into the midland districts, as Leicesters, Oxfordshire, and Warwickshire, from the grazing farmers in those districts finding them to answer upon their pastures more perfectly. And in Suffolks, the prime breed is also held in considerable estimation by the farmers, as well as their own variety of it, as they are both bowld to fatten kindly, and with considerable expedition, upon their lands, and to have a ready sale in their markets and fairs.

However, in the more arable or tillage districts of Norfolk and Suffolk, where turnips and artificial grazings are more in use, the Kilc, Galway, and other small Scotch breeds, as well as those of the Welsh runt kind, are in preferable demand, from their answering better upon those forts of food, their more kindly disposition to fatten, and the excellent quality of their flesh, which never fails to have a ready sale in the London market, where the greatest part of their fat flock is sold. But the grazing farmers in the northern counties have mostly recourse to their own long-horned breed, raised on the farms, with the different Scotch breeds brought into the districts, their home fort being in their experience the leaf disposed to take on fat and become saleable. And the large Hereford fort, as well as that kind of Welsh cattle termed the Glamorgan, are allo very advantageous grazing flock in situations where the pastures are good, and they can be finished with other forts of food. Great numbers of the former of these forts are purchased by the graziers round the metropolis for being fattened or brought considerably forward on the rich grass lands, which have been mown for hay, and finished with other forts of food. Yet the small breeds of the Scotch, Welsh, or other finer kinds, may, in many cases of the inferior forts of grazing lands, be the most beneficial in affording profit to the farmer, as he can fatten them more to the nature and state of such lands, and they have more chance of becoming fat. But, if indeed it has been stated in the tenth volume of the Past Papers, on the experience of fifteen years, that the small animal has generally "a more natural disposition to fatten, and requires (proportionably to the large animal) less food to make it fat; consequently the greater quantity of meat for consumption can be made per acre." If this point was satisfactorily proved, there could be no doubt of small animals being preferable both on this description of grazing land, and that of a better quality; but, as an able and accurate observer has upon much experience been induced to think differently on this subject, the grazer should be cautious how he has recourse to small breeds upon lands that are capable of fattening large ones, until the question has been fully decided.

In respect to what relates to the fort of cattle that may be employed to the greatest advantage under this system, oxen, and fuch heifers as have been fayed, are in general considered, by the bel informed graziers, as the best fort of flock; as besids being more quiet, the latter have not only the property of fattening in a more expeditious manner, but with a less consumption of food. They are not, however, to ready provided by the grazer. The ox is of course the most commonly, as well as most extensively, employed for the purpose of the grazer, as having the advantage of being capable of being fattened, and of affording good beef, after he has been beneficially wrought in the team of the farmer. Cows, under different circumstances, are likewise often bought in by the grazing farmer for the purpose of being made fat, such as those that have become dry, have flipped the calf at an early period, or are becoming aged; but much caution is necessary in the purchase of this fort of grazing flock, as they frequently turn out less favourably than bullocks or heifers, though in some cafes they leave a good profit. When old, they rarely thrive well or get fat with any degree of expedition. Indeed it is, perhaps, the best way, in all cafes, for the grazer to have such flock as is not too far advanced in age, as young animals are invariably more disposed to get field, and become fat, than such as are old. In the grazing of such heifers and cows, they should be suffered to take the bull as soon as they have an inclination, and be ready for being fold off fat several months before the time they would have calved. Such cow or heifer flock as are in calf, may sometimes be purchased in at a cheap rate in the fairs in the autumnal season, and be fattened off in the early spring with a good profit. There is likewise another description of this fort of flock sometimes grazed, which is what are termed free martins, or cows that are barren; but they are said to feldom answer in this intention in any very advantageous manner.

In relation to the most proper sheep flock for the grazer, when the pastures are rich, and afford full keep, the improved, large long-wooll'd breeds, as the new Leicelters, may yield


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the best profit; but where the lands are less rich, and the feed of coarse-leaves plentiful, thefinal, improved, short-woollen breeds, as the South Downs, may leave a more ample profit to the farmer. Where wethers of the former kind can be procured, they well turn out well for the purpose. And in the contrary circumstances, perhaps the South Downs cannot be excelled by any of the short, or middle-woollen breeds. But in particular situations and circumstances of grazings, many other breeds may, however, be more profitable to the grazing farmer. It is stated, in the Agricultural Survey of Somersetshire, that the Dorsets, formerly so prevalent in that district, have lately given way to the polled, native breed of the lower part of the county; from their females of their giving a larger proportion of wool, and their fattening more expeditiously, and at the same time more fully, especially in the internal pastures. However, in the rich marshes in the southern parts of the island, the grazing farmers, who are mostly in extensive businesses, have constantly recourse to the polled, white-faced breed, and that of the South Down, which they find the most profitable forts on their lands that can be employed.

In the northern parts of the kingdom, the graziers have principally recourse to the native breeds, the heath and Cheviot, and find the former the quickest in getting fat, and the most hardy in their nature. The Cheviot breed, however, latey to have gained ground in the more elevated and hilly pastures.

Whatever the breeds of the animals may be that are made use of as grazing flocks, it has been found, from long experience, that it is a matter of much importance to procure them from districts, where the quality of the land is inferior to that on which they are to be fattened, as by such means they not only get fat in a more expeditious manner, but without suffering any check upon being sent upon the pastures.

It is a matter of much consequence in sheep grazing that they have a fine clothe pasture; and that they be prevented from going upon such grasing-lands as have been covered by water, and become sandy. As under such circumstances, they are liable to become diseased. And besides this, it may be beneficial in many cases for the farmer to be careful that horses are not turned upon the pastures along with them, as it has been found that the turf of long, rank grasses that rise about the dung-heaps, are apt to render them in a state of disease, except where frost has taken place, when the danger is for the most part removed; and it is supposed, that it is also dangerous to suffer sheep to browse upon such a pasture, especially that of barley, which hoofs up among the stubble, after the harvest is completed; and that the long grasses unfound are equally detrimental, whether the soil be light or strong. In the former situations, they frequently pull up the herbs by the roots, which they eat with the dirt adhering to them, which will inevitably give them the rot; and, if the long grass be strong land, and should not afford a sufficient supply of food, they are liable to the hunger-rot, from being compelled to eat the rank, unwholesome vegetables produced upon such grounds, especially the arrow-wort, and the marsh-penny-wort, both of which plants flourish in wet situations, and ought carefully to be eradicated wherever they are found. It is further advised, that in turning sheep into pastures, particularly water-meadows, and also into those pastures that are subject to rot, to purse the same precaution as with neat-cattle; which is previously to satisfy the craving of appetite, by giving them hay or cut straw, and after the dew has been evaporated by the rays of the sun, to drive them gently round the field for two or three hours before they are suffered to eat. But, whenever any fort of dry food is given, they ought to be supplied with pure water, particularly during the intense heat that usually prevails in the summer months, and which often renders the grass as dry as a fluff. For this purpose, clear, light-running water is always to be preferred, where it can be obtained; though, in general, whatever prevents itself is made use of. But where this necessity of life is found only in a tainted state, or overcharged with the juice of dung, it will be advisable to give them well-water in troughs or shallow tubs. This must be particularly attended to in the folds, so long as the sheep are confined there by the severity of the weather. It has been noticed, that "the watering of sheep is, on the Continent, regarded as a circumstance of the greatest moment, and accordingly, receives that attention which it requires. Thus, in Sweden, and at the national farm at Rambouillet in France, they are daily watered with running-water, or with that obtained from lakes or springs, fraught with most properly and rigorously prohibited. And in some of the Saxon sheep-farms, the sheep are watered in the cogs or folds during the winter, instead of taking them to watering-places. Spring or well-water is conducted by means of pipes into troughs, out of which the sheep drink at pleasure; they in consequence drink oftener, and each time take less water, which is favourable to their health. The ordinary mode of watering sheep in that, and we may add in many parts of our own country, is attended with many inconveniences. The animals refuse to drink water in the winter, if it be too cold; they hurry while drinking, and do not take enough when the weather is very windy, or hail, rain or snow falls. "Between which, they often disturb the water with their feet; this disgusts them, and at length one part of the flock completely prevents the other from approaching the watering-place." And it has been advised to fold them before the dew falls in summer and winter, and never remove them till it excites, letting them have hay or other dry food of some sort.

It is stated, that all grazing-land of rich quality ought to be felled with sheep, cattle, and horses, so that the grass may be eaten clean off; for, unless it is regularly depauperated, much damage ensues. Each of the above three kinds of animals prefers, as most palatable food, some grasses which the others reject; and none of them will bite near their own dung, though they may near that of others; and thus they conjointly contribute to keep the pasture level without much expense. Pastures or grazing-lands should be kept as level as a bowling-green, both for ornament and use; for, by one part being left higher than another, the long grasses increase in patches; and land where it grows may be considered as taken away from the pasture, as the cattle will almost sooner starve than eat it. By leaving the fort of grasses the animals refuse from year to year, the land incroaches in weeds, plants, and diminishes in useful ones; as the feed of such plants continually drops, and the useful ones are prevented feeding by the cattle eating them. If such pastures were mown in those places, it would give the useful plants room to grow. There are in this kingdom an infinite number of acres of rich and excellent land, which, from bad management, and from want of judgment in flocking, become of no more value than a barren soil. But such grazing land as is intended for the purpose of feeding cattle, a few sheep are conceived absolutely necessary to cut up the weeds. If any part of the pasture be getting into beets, or higher grass than it ought to be, and the animals begin to neglect it, you must mow it immediately, and as near the ground as possible; for the clover you cut down such coarse parts, the sweeter and the quicker will the grass spring up in the place. Could animals, by hunger, be driven

Vot. XVI.
driven to eat the long grasses, they would not fatten upon it; for, as the nearer the bone the fweeter the flesh, so the nearer the ground the sweeter the grass; it is not, he supposes, so much the quantity as the quality of the food that must be attended to. And in further proof of the advantage of hard focking, it is flated, that it is a common complaint, that the land is good in spring, but it goes off. Is this to be wondered at, when one-third, or perhaps one-half of the yield is become fo rank, that no one animal in the pasture will bite a mouthful of it? Suffer the very best piece of graves-land, entirely free from weeds, to be without either eating off the grass, or mowing it, and in a few years it will be over-run with weeds, have very little useful grasses in it, and in fact be little better than rubbish. Consequently, there can be little doubt of the beneficial consequences of hard or close focking on the older forts of grazing-land; but on the new keys it should probably be seldom attempted, as injury may be done to fuch lands without the flock being thereby adequately improved.

But in grazing farms, there are several different styles of management pursued, in respect to cattle as well as sheep. The practice with some graziers is, "to purchase their cattle in the fairs in the autumn, about October, or in the following month, supporting them through the winter, principally with straw, or sometimes, which is a much better practice, with a little hay mixed with it, till towards the beginning of March, continuing their fattering through that and the fucceeding month with some fort of succulent food, such as turnips, potatoes, or other fimilar kinds, until the grdfs be in a flate fit to be turned upon in May, on which they may be carried forward and completed, according to circumstances, about August, or in the following month."

And another practice "is to purchase their heifers lean, as soon as the grdfs-lands are in a flate fit to be turned upon in May, wholly completing their fattering on the grdfs about the latter end of October, or later in the autumn, according to their quickness in feeding. In this fystem of management, the smaller kinds of cattle flock may be found in general the most advantageous, especially where the lands are of the lefs fertile and luxuriant descriptions."

Another practice, sometimes had recourse to by grazing farmers, but which is, in general, perhaps less profitable then either of the above modes, is that of buying in flock at such periods, according to the difference in their prices, as that they may be ready to be fold off about April, or in the fucceeding month, a period at which they utually fetch high prices in the markets. It has been observed, that "in this fystem, with large oxen or other forts of beasts, it is sometimes the practice to keep them through two winters, giving them only one fummer's grdfs; being in the firit winter not fully fed, but kept in good grdfs in the fummer feaon, and forced on with the beet feeding in the second; but with the smaller forts of flock, one fummer's grdfs and a winter's feeding is the usual mode; the cattle being brought in as soon in the spring as the grdfs is rifen to a good bite."

It is in very few instances that the animals can pay for this length of keeping. And, "in some diacrtics, heifers are preferred to oxen; in which case, they buy them in about March or April, and after keeping them through the fummer, sell in October and November."

This method is thought, by some, a profitable fystem of management." By the author of the Modern System of Practical Agriculture, on these different styles of feeding, it is noticed that they may all "probably be practifed with advantage under diferent circumstances; but it is obvious that the first can only be had recourse to with propriety, where green winter food is raised in sufficient abundance, and the grazier has a flore of litter for being converted into manure. Under other circumstances, the second mode of management will be much more profitable. The two fift methods are the leat convenient, and, probably, on the whole, except in very favourable circumstances, the leat profitable, especially the former of them, as, from the great length of time which they are kept, much management and attention to food becomes necessary to render them advantageous; which, with common servants, is seldom sufficiently regarded."

But in addition to these several modes or plans of fattening next-cattle, there is a practice followed in some rich hay-diarcrics near large towns, and particularly by the hay-farmers in Middlesex, which is, that "of buying in small cattle in tolerable condition in the autumn, as soon as the after-grdfs is ready, in order to their being fattened out on the roans, and disposed of towards the latter end of October, or beginning of the following month."

And, regarding sheep flock, the same difference of systen takes place; as, in some cafes, where the lands are in a state of inclosure, it is the "practice to buy ewes in lamb in the latter end of summer or beginning of autumn, keeping them on the inferior forts of graves-lands, hedges, or falls, till the beginning of January; and then, by giving them turnips or cabbages, to keep them in good condition through the period of their lambing, and afterwards in the belt manner that can be contrived, in order that the lambs may become fit for the butcher sufficiently early to admit of their being afterwards fattened, and disposed of in the beginning of the autumn."

This, in many cafes, is found a profitable systen of management, but which requires much care and attention in directing it.

Another practice in this business is, to purchase wether flock about the beginning of May, at the age of two or three years, keeping them sparingly till some weeks after the grounds have been cleared from hay; then bringing them to good keep in the roans, afterwards fattening them by means of turnips or cabbages, so as not to have them ready sooner than the beginning of March, which is commonly the season in which they fetch the highest prices. In this systen of grazing management, a good profit is mostly afforded by farmers who pursue it in a judicious and ready manner.

And a further practice in fattening sheep is pursued in some cafes with great profit and success, which is that of buying in lambs of the wether, or other kinds, about the beginning of September, which are kept in different methods by different graziers, being by some brought forward with the greatest possible expedition by the best keep, so as to be ready to be fold off as soon as possible. But others have recourse to the contrary method, keeping them only in a middling way during the winter, till about the beginning of April, and then forcing them forward by good keep, so as to have them ready for the butcher in August, or continuing them in the following month; and then clearing the whole of the flock from the land. In this practice, large profits are often made by judicious graziers, especially when situated near large towns where the population is great.

Another systen of fattening, which can only be pursued to advantage in situations near large populous towns, is that of providing graves-lands for the markets as early as possible in the spring months, which pays the grazier well in many cafes. With this view, it is the practice to procure the more forward ewes, such as those of the Dorset breed, which drop their lambs in the beginning of January, if not before. In Middlesex, where this management is much attended to, in consequence of the great demand, it is the custom

Grazing.

for being converted into manure. Under other circumstances, the second mode of management will be much more profitable. The two last methods are the least convenient, and, probably, on the whole, except in very favourable circumstances, the least profitable, especially the former of them, as, from the great length of time which they are kept, much management and attention to food becomes necessary to render them advantageous; which, with common servants, is seldom sufficiently regarded."
tom to purchase this sort of ewes at Kingston, Weyhill, and other fairs in the neighbourhood. The ewes, in order that they may have a plentiful supply of milk, are extremely well kept on turnips, brewers' grains, and fine green sweet rooten hay, and the lambs thereby forced forward in such a rapid manner, as to be ready for the markets in the beginning of March or April. And the ewes, from their becoming dry so early, are capable of being fattened and disposed of towards Michaelmas, usually fetching the prices at which they were purchased in at; as the whole of the flock is in this system cleared within the year, the farmer has the opportunity of fully ascertaining its advantage or disadvantage.

The statement of which is thus given in the able Survey of the Agriculture of the County of Middx,:

<table>
<thead>
<tr>
<th>Statement</th>
<th>£. s. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamb, fold at</td>
<td>- 1 10 0</td>
</tr>
<tr>
<td>Ewe, &amp;c. do.</td>
<td>- 1 10 0</td>
</tr>
<tr>
<td>Wool, 2s. 6d. or</td>
<td>- 0 2 0</td>
</tr>
</tbody>
</table>

Together

Deduct prime coll

Remains the increase of an ewe in one year - 1 10 0

It is hinted, that "in this management very much depends upon keeping the ewes perfectly well fed, and in dry warm enclosed pastures, as without such attention the ewes are apt to become thin and lean, in consequence of the greatness of the evaporation, and afterward to require a much longer time in being made fat," by which means much loss must be sustained. In the Economy of the Midland Counties, a notice in respect to fattening grafs-lambs, is suggested, which in particular cases may be beneficial; which is that of removing the lambs from the ewes when they decline much in milk, before they are perfectly fattened, in order to complete them on young clover, or other sorts of prime keep.

The chief object in this case is, that of the ewes becoming sooner ready for the butcher. Some, also, conceive, that after the first flush of milk is gone, and it begins to be scanty, the lambs thrive better "on grafs alone, away from the ewes," than when kept along with them, as the hankering after the little milk that is afforded prevents their feeding freely on the grafs. Hence it is supposed, that "where this method is followed, which can probably be with advantage only where the milk of the ewes is greatly deficient in supporting and bringing the lambs forward, much attention must be paid to having the keep early and in abundance. In this view, rye-graSs and white clover for early use, and broad clover at a later period, may be the most proper and useful crops. In this management the ewes should be carefully examined occasionally; and, where much deficiency in the milk is found, the lambs be immediately removed to the pastures."

In respect to the flocking of grafs-lands in the most advantageous manner for the grazer, it must depend materially on the richness of the lands, and the nature of the flock in respect to size, and other circumstances. But, according to Mr. Billingsley, the Somersetshire graziers, in flocking the rich and middling sorts of grafs-land, allow, to an ox from one acre to an acre and a half; and one and a half ox to each ewe. But, in Lincolnshire, they flock in much larger proportions; as is shewn in the Agricultural Survey of that district, where they are brought into a tabular form as below, for the more rich pasture land.

<table>
<thead>
<tr>
<th>Names of places</th>
<th>Sheep in farm</th>
<th>Acres per sheep</th>
<th>Sheep returning</th>
<th>Sheep returning with land sheared</th>
<th>Stale of</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Sutton</td>
<td>51</td>
<td>2 1/2</td>
<td>No bulk cheese.</td>
<td>35</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Mr. Scroop</td>
<td>41</td>
<td>1 1/2</td>
<td>2</td>
<td>20</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Bolton, &amp;c.</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Skirbeck</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bolton</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Deeping Fen, Mr. Graves</td>
<td>5</td>
<td>2</td>
<td>10</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aldershurgh, Mr. Berridge</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swinheath</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ewerby</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Horbling, &amp;c.</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Howel</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Immingham</td>
<td>1 1/2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Granthorpe, &amp;c.</td>
<td>3 1/2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Stalkborough</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Skibrook</td>
<td>1 1/2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ditto, &amp;c.</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Addelthrope</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Colerton</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Burgh, &amp;c.</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Wrangle</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Hundred of Skirbeck</td>
<td>2</td>
<td>2</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiberton</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Marsh Chapel</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ditto</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Grimby</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Average - 3 1/2 1 1/2 2

Upon this it is observed, that "considering the size of the sheep, which cannot be estimated at less than 200 lb. a quarter, on an average; and that the bullocks rise from 50 to 100 fl. (14 lb.), this rate of flocking is very great indeed. There are, on every acre, 360 lb. of mutton, and reckoning the bullocks at 20 fl. each, dead weight, there is also 376 lb. of beef; in all, 696 lb. of meat per acre, besides the winter produce, which is immense."

But, in the rich grazing counties in the more southern parts of the island, a large proportion of both sheep and cattle flock is admitted per acre: the exact proportion, however, differs with different graziers very greatly.

But the great and leading principle in this business is, however, never to flock in such a manner as to restrict the animals in the leaf; as it is by their being enabled to fill themselves quickly, and to lie down much, that the greatest progress and advancement in fattening are made, whether in flock of the cattle, sheep, or any other sort, when at grafs. But, on the inferior or weaker grafs-lands, a much smaller proportion of flock than on those of the rich and fertile kind only can be employed. It can frequently not be more than an ox and a sheep or two, to two acres, or two acres and a half. However, in flocking with west-cattle, for the purpose of fattening, it should constantly be such as the animals may have a full bite; but with sheep, such as to keep the pasture in a rather close state of feeding. Another circumstance is necessary to be attended to, in order to bring the grazing-flock properly forward in pastures, which is that of changing them more frequently than has generally been the case with grazing farmers. And it is, perhaps, on this principle, as well as those of their affording greater degrees
Grazing.

The same writer also adds, that "the manner of flocking a grazing farm in the marishes differs according to the nature of the land. In Romney Marsh, the views of the grazier are chiefly directed to the breeding and management of sheep; and in the Isle of Sheppey, both bullocks and sheep claim his attention, whilst in some parts the marsh land is wholly appropriated to the breeding of horned cattle and colts. Tho' grazing farms are most eligible, which admit of breeding and fattening on the same paiture. This is the case with Romney Marsh, a tract of land to eminently distinguished for a valuable breed of polled sheep, that it furnishes the graziers of Sheppey, and other places in this county, with an annual supply of lean-flock over and above what is reserved for feeding; so that it is evident the graziers here enjoy a double profit from his farm, though it is believed, since the increased value of lean-sheep, that the graziers in the Isle of Sheppey have many of them adopted the method of breeding their own flock." This is probably the most beneficial practice.

In the county of Wiltshire, the cattle bought in in September are wintered on the coarse pastures and in the ikra-yard. In May following the young ones are sent to the commons; and those of an older description turned upon the best pastures as soon as possible, according to the circumstances of the situation. But in the Agricultural Report of the North Riding of Yorkshire, it is said that "there the usual time of breaking the pastures is the 12th May, from which time they continue regularly flocked until about October, when, if the stock consists of milk-cows, or feeding cattle and sheep, they are removed to the grass pastures; the pastures, with the addition of the stubbles, remain flocked during the winter with more sheep or lean cattle; but the latter are, by many farmers, taken into the ikra-yard for the night. The herbage of the pastures is, however, it is thought, thus completely destroyed before winter, and the land thus left is harrowed, and the growth of moss greatly encouraged, to the almost certain ruin of the grass-land. An influence has not occurred in the course of the survey, of the practice of preferring a considerable part of the fanner's growth of grass upon the land, for spring feed, a practice well worthy of attention. This winter clothing, it is supposed, enriches the fowards, destroys the moss, and, by keeping the roots of the grass warm, causes an early vegetation in spring, when the scarcity of the herbage to much enhances the value of it. On farms, the foil of which is not adapted to turnips, this practice would, it is said, be peculiarly beneficial.

"In March, the land intended to be pastured the ensuing summer, is, or ought to be freed, and the stock put into the land intended to be mown, where they remain, until those pastures are broken up in the beginning of May.

"In the dales of the Moorlands, the lower lands only are adapted to meadow; consequently, the land cannot be changed alternately from meadow to pasture, as may be practised in many other parts of the Riding; though there, as before noticed, the practice is not sufficiently attended to. There are many instances of cow-pasture, which have been invariably fummer-fed during several generations." See Pasture-Lands.

"The bell farmers usually pasture their new laid ground the first two years, and that chiefly with sheep, as sheep improve grass more than any other kind of stock, both by their trading more lightly and uniformly, and by the dung and urine being more regularly dispersed over the land. But the practice of eating them very bare during the first autumn and winter after favours, and also moving them the first summer, is too prevalent; such practices are, it is observed,
Grazing.

erved, the ruin of seeds. Some, however, think that
patturing new laid ground is most excellent management;
the several grazings, by being frequently cropped, becom
not only firmer in nature, but much more numerous. Stock,
when patturing new lands, ought to be often changed; if
ever you over-cast, they will require some time to recover
their usual vigour. New laid-grounds sometimes give sheep
the rot, particularly three or four years laid, on indifferent
foils."

And the practice of shifting the stock from one paiture
to another, of mixing different kinds of flocks together in
a due proportion in the same pasture, and under flocking
with sheep, pastures deftined for feeding larger cattle, should
always be particularly attended to.

It is stated in the Survey of Lincolnshire, that “the rich
grazing lands are the glory of that county, and demand
a singular attention. The soil is a rich sandy clay, fome
very diff, but of uncommon fertility, as may be known
by various instances. Some of the grazing lands in Long
Sutton that were common, will carry five or six sheep an
acre, and four bullocks to ten acres. Mr. Scrope has
there four acres, which carry 45 sheep in summer, and must
be bobbed often to keep it down. And on the gras-lands in
Deeping Fen, improved by paring and burning; Mr. Graves
keeps five sheep an acre from Lady-day to Michaelmas, and
one and a half in winter, and a bullock of 60 stone to two
acres besides in summer.”

And from some trials which were made by T. Frydell,
eq, in the grazing of near cattle on the belt foirt of ground
in Lincolnshire, and which are given below, Mr. Young is
led to conclude, that 41. an acre is the highest rent he has
heard of in that county, and much higher than common,
even for the bell lands. This seems to confirm the idea he
has entertained, that the rich grazing lands of this district
are better rented than fuch or nearly fuch lands in other
parts of the kingdom. And further, that “the average
weight of the beasts was 70 stone, being of the York or
Lincoln breed; the sheep all Lincoln. The former bought
in April or May, and all gone by the 11th of December;
the sheep are bought in May; they are clipped twice, and
fold fat in April or in May following; that there is little
difference in feasons, except that, after a bad winter, the
sheep are not ready for market fo soon by a month as they
are after good winters. The losses in weight in driving to
Smithield is very little; the expense, beait 15. 9d. sheep
11. 9d. each. Mr. Frydell held for severai years a piece
of land in Skirbeck parish, which measured 21 acres, and
kept, communibus annuis, from Lady-day to Michaelmas, 19
heavy beasts, and a 100 sheep, and birtened fifty sheep.
And he now holds a paiture adjoining his garden, at Bolton,
of eight acres, which keeps in fummer ten oxen and forty
sheep, and winters thirty sheep. But the finest grazing
lands are at Bolton, Aldercruch, Foflyke, Sutherton, Kirton,
Frantun, Whiberton, and Skirbeck: these will carry, in fummer, a bullock to an acre and a half, besides
four sheep an acre; and two sheep an acre in the winter
season.”

It is stated that “the Rev. Mr. Berridge, of Aldercruch,
has near his house forty acres of the rich gras, upon which
the flock is upon an average 300 sheep; sixteen fattening
bullocks, three cows, four hurles, and carries through the
winter three sheep an acre. This land is valued at 40s. an
acre. It is a vail flock. He favoured him with these partic-
ulars in the presence of a dozen neighbours, and called in
his manager to confirm it; it wanted, therefore, no after-
corrections.” And “in the grazing lands at Swinehead, a
beast an acre of 40 to 70 stone, and two or three sheep; 150
two sheep an acre in winter. Mr. Tindal, at Ewerby, which
is on high-land, compared with Holland Fen, flocks a bul-
lock to two and a half acres, and three sheep per acre in
summer, and two sheep an acre in winter. And in the lord-
ships of Horbling, Billingborough, Berthorp, Semp-ling-
ham, Pointon, Dowby, Dunby, and Hackonby, there are
extensive tracts of rich grazing land applied to fattening
bullocks and sheep, carrying a bullock to two acres, and three
sheep per acre in fummer; and two sheep an acre in winter,
which lands are generally rented at 3s. per acre. Mr.
Eikington, of Howel, keeps one bullock and nine sheep to
three acres, and in the winter two sheep an acre.”

But “Hanworth, north of Lincoln, is chiefly grafs which is fed
by cows, calves, and young cattle. On the Law at Norton
Place, which is heath-land, two couples per acre in fummer;
but the foil not adapted to permanent grafs without great
exertion.” And “there is a tract of paiture-land, which is
of considerable extent north and south, but very narrow
east and west, which lies in the vale between the heath and
the Wolds. It viewed it from Norton Place going to Owerby, which is in it; the quality is good, but of the
second rate.” And further, that “the gras-land ele to
Gainsborough last at 4l. and 6l. an acre.” The marsh grafs
on the Trent and Knaiia, &c. 20s. to 30s. and produces
one and a half or two tons of hay an acre. The marshes on
the river are stocked from the 12th of April to the 12th
of May; this of late has, however, been omitted, as they
found the gras hurt by it. Clear the hay by Lammas, one
to one and a half ten an acre. Then turn in milch-cows,
and afterwards other-stock, till November. Rent 20s. but
measurc short. And at Garthorpe, in marsh-lands, some
rich grazing lands, which will carry a good bullock an acre,
but no sheep fed. This land is now let to break up at
3l. 15s. an acre for 14 years.” But that “Mr. Heffelden,
at Barton, has four acres near the town; levelled and ma-
ured it after the allotment, and this year it feeds four
cows; three of them joifted at 3l. a week, a produce of 12
guineas. At Immingham and Stallenborough, there are
some marsh-lands that will carry nine bullocks of 60 stone
upon 12 acres, and 12 sheep, and two flocks of bullocks in
winter; some has only one. But the same lords have, it is
remarked, clay pastures that will not do any thing like
this. And, at Thornton college, Mr. Uppeby has a few
clopes of extraordinary fine grazing-land, which will carry
the largest bullocks, and it is worth, he thinks, 50s. an acre
rent.

“ The marsh on the coast of Grainthorpe, Saltfleetby,
and Thedlethorpe, &c. is very good: it will keep three
sheep an acre, and an ox to three acres; and one sheep
and an half to an acre in winter. The hilly wold good paitures
on marl and chalk at Gayton, near Louth, will carry three
ewes and three lambs per acre, and a sprinkling of young
cattle, &c. besides; some only two ewes and lambs, besides
beasts, such land as is worth 15s. to 2zs. an acre. In the
marshes that are in the vicinity of Saltfleet and Sutton,
there is some defiance, which it will be proper to note by
particulars. In Northcots, the quality rather inferior, being
chiefly for breeding. There Chapel, better, but ill like
and for breeding also. In Granthorpe, a great deal very
good grazing land. Coultholm, low, swampy, and but
little good. Skidbrook, a great deal, and very good. South
Somercots, the same; but 1000 acres of 50s., or common
meadow. The three Saltfleetby's 5000 acres, and a great
deal very strong and good for feeding beasts. Some of the
late Mr. Chaplin's marshes here hold fo high as 75s. the
flute
In the Theddlethorpes, much very good; but some low, and not well drained. Marblemorton, very good. Sutton, remarkable good and strong feeding land.

"In these marsh parishes, the rich grazing ground of the first quality lies at about 40 sh. an acre, and the roll about 30s. Such as will not breed, but are used for hay, at 20s. to 25s. per acre, and this division of feeding and breeding is here also expressed by saying, that one part of marsh will feed sheep; but the other, keep them in holding order, will make them hold the flesh they have got, but not fatten profitably. If the stool of these lands is compared with the grazing districts of Boston and its vicinity, it was remarked to him, that these are more naturally good, and much better watered: they have at all times plenty of fresh water here, which is a great object; but for artificial fertility, locality to towns and markets, &c. the Boston lands are much superior. The mead at Boston, &c. is here said to be more than an acre; here left, not more than three roads, and the ing land still left. On ten acres, at Skidbrook, eight beafts and sixteen sheep have been summered, and the sheep wintered also. And, in general, the marsh that lies from 30s. to 40s. will carry a beaft to two acres, and two sheep an acre; but, perhaps, he says, more generally one and a half sheep."

With respect to the profit of grazing the beart land, it is stated in this manner:

**Statement.**

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>A beaft bought at 2 cl. to two acres, at the profits of 4l.</td>
<td>2</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Two sheep per acre, bought in at 45s. and sold at 55s.</td>
<td>1</td>
<td>00</td>
<td>0</td>
</tr>
<tr>
<td>Four fleeces at 9½. 38½. at 8d.</td>
<td>4</td>
<td>15</td>
<td>4</td>
</tr>
</tbody>
</table>

**Expenses.**

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>2</td>
<td>00</td>
<td>0</td>
</tr>
<tr>
<td>Tithe</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Rates</td>
<td>0</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Dyke-reeve</td>
<td>0</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Shepherding</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Watering and clipping</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Incidents</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Capital employed</td>
<td>24</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

**Interest of Capital.**

- Bullock, half:  £.6 o 0
- Two sheep:  £.3 0 0

**Going to look at stock:** £.0 o 6

The grofs interest rather better than 10s. per cent.

Mr. Parkinons, of Reefesby, observed, that the rich marhs were better managed, and in better order, twenty years ago, than they are at present; the wold farmers had not then got such possession of them, and they were in the hands of resident graziers, who attend more to holding, which kept them fine; for nothing hurts marsh land so much as letting it run coarse, from permitting the grazs to get a head. And he calculates an acre of rich marsh in Wrangle, &c. thus:

**Expenses.**

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>1</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Tithe</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rates</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Dyke-reeve</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Ditches, folds, and gates</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Interest</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>
Grazing.

Grazing Account of ten Acres of the first Quality.

<table>
<thead>
<tr>
<th>Expenses</th>
<th>£. s. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot; Rent</td>
<td></td>
</tr>
<tr>
<td>Tithe, 3s.</td>
<td></td>
</tr>
<tr>
<td>Town charges</td>
<td></td>
</tr>
<tr>
<td>Poor and contable, &amp;c.</td>
<td>2 7</td>
</tr>
<tr>
<td>Church</td>
<td>0 0 3</td>
</tr>
<tr>
<td>Highways</td>
<td>0 0 5</td>
</tr>
</tbody>
</table>

In the pound 0 3 3

<table>
<thead>
<tr>
<th>Profit per acre</th>
<th>£. s. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 2</td>
</tr>
</tbody>
</table>

Or total interest 111. 5s. 6d. per cent.

In the hundred of Skirbeck, the pasture consists of three
forts in point of rent, &c; the highest at about 45s. being
from 32 to 50s. The second from 26s. to 32s. average
28s. The third, average 1s. 10d. Besides this a small
quantity of open meadow, called ingles, average about
18s. The best kind of pasture is chiefly stocked with
shearing wethers, bought at the spring market at Boston,
which, having yielded two fleeces of wool, are sold off
early in the next year; and by beasts in the summer, fold
in autumn; some kept on farther in eddibh, but all gone
in the winter. The second best is chiefly fed by young
beasts and hogs, kept on to shearings; these are well kept,
as their value materially depends on it; there are also
some few breeding sheep on this division of the pasture.
The third class is chiefly mown. But it is to be noted
that all these particulars relate to an acre larger than statute
measure, about 43 roods."

"The first division is stocked at the rate of three sheep
per acre, winter and summer, with the superlative of some
bought in the spring, and not cleared from the land till
some months later than the time at which they are bought.
The heaths are in proportion, on an average of seven to ten
acres, from 5s. to 10s. The second class winters
about five sheep to two acres, with not less than four
per acre in summer, with a few cows and young beasts; and
on both these there will be some few horses, too uncertain
for average. On the better land, they are chiefly horses making
up for fail; and, on the second quality, horses employed
in work, or young ones; it is not usual to keep any horses
in summer except on the pastures. The produce of hay
on the third may be about 35s. an acre; the eddibh eaten
by cattle from the other grounds; or by hams or hogs,
before they go to their winter keeping.

The writer hints that the profit upon this first class of
land is greater than upon the rest; and that the third
yields very little profit by grazing, and would pay much
better in tillage. There are many graziers there, who have
no other land than what is upon these flats, and some who
are supposed to have made by their business enough to have
realized
realized a comfortable subsistence. The grazing accounts of certain fields in the occupation of Mr. Loft, of Math Chapel, are stated in this way:

<table>
<thead>
<tr>
<th>Expenses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&quot;Rent</strong></td>
<td>£1 15 0</td>
</tr>
<tr>
<td><strong>Tithe</strong></td>
<td>0 2 0</td>
</tr>
<tr>
<td><strong>Rates</strong></td>
<td>0 3 0</td>
</tr>
<tr>
<td><strong>Shepherd</strong></td>
<td>0 1 0</td>
</tr>
<tr>
<td><strong>Interest of capital</strong></td>
<td>0 12 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2 13 0</td>
</tr>
</tbody>
</table>

"It carries a bullock to two acres, and three sheep per acre.

<table>
<thead>
<tr>
<th>Product</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&quot;Half a bullock</strong></td>
<td>£1 10 0</td>
</tr>
<tr>
<td><strong>A sheep and half</strong></td>
<td>1 10 0</td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td>2 13 0</td>
</tr>
<tr>
<td><strong>Profit</strong></td>
<td>0 7 0</td>
</tr>
</tbody>
</table>

Of better land.

| Rent          | £2 5 0  |
| Sundries      | 0 7 0  |
| **Interest of capital** | 1 4 0  |
| **Total**     | 3 16 0  |

It carries a bullock and three sheep an acre.

<table>
<thead>
<tr>
<th>Product</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A bullock</strong></td>
<td>3 0 0</td>
</tr>
<tr>
<td><strong>Three sheep</strong></td>
<td>3 0 0</td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td>6 0 0</td>
</tr>
<tr>
<td><strong>Profit</strong></td>
<td>3 16 0</td>
</tr>
</tbody>
</table>

Grazing.

It is however stated, that very few fields will yield anything like this; he has but one close; and there are some expenses omitted. And "Mr. Tennison, of Lincoln, has 43 acres of marl at Grimby, that summer-feeding 14 bullocks; and carries 35 sheep the year through." But that "in the tract of marl-land on the sea-coast, they observe, that where most grasses is left in autumn, there the herbage is the coarsest and worst next year; the remark was made in answer to recommending eddiis for spring-feeding sheep, which would not do so on rich marl, though it might on uplands." It also shows, that the system of close feeding is proper, and would answer well in many districts where it is not the practice." And "in the hundred of Skirbeck, they like to have a tolerable head of grass in the spring, before turning in; and afterwards go to stock as to prevent its getting coarse by running away, so as to prevent the necessity of hobbling; which, however, must be done in a wet growing season."

But after the flock has been brought into a proper state for the market, there is in many situations much difficulty in Dispose of it to the best advantage. Mr. Marshall has remarked, that though it be attended with less difficulty than that of buying in the flock, it requires much knowledge, as well as experience, to execute it in the best manner, or with the least possible loss. A due consideration of the prospers of the flock while feeding; and of the length of time they have been upon the land; may afford some fort for guide in the business; but the most correct judgment may be formed by the young grazier, by the practice of frequent weights, and the accurate comparison of the living with the dead weight of such flock as are killed in his neighbourhood, as it is a much more certain method than the use of the eye and hand, as has been shown under the head Graziers. Having recourse to frequent weighing has also the advantage of showing the progress that is made by animals under different forts of keep or food. But besides this, the grazing farmer must be regulated in the sale of his flock by the nature of his situation. In most of the midland and southern parts of the kingdom, Smithfield is the place where the fat flock of the farmers are disposed of; while in other parts, they are frequently sold in the neighbourhood, or to the large towns which are at no great distance. In the former cases, especially on the less extensive farms, the Fat Flock are brought out to be sold, and the make it a bullocks, being employed by various graziers in the name vicinity, who have an entire confidence in them. With the more extensive graziers, who fend up frequent lots, the business is done by a salesman, in whom they have confidence. With little grazing farms, the computer is often to sell them to the butcher in the neighbourhood, which is frequently the best method. And the advantages of these different modes must depend greatly upon circumstances. Some, however, suppose that the London market is the best calculated only for those who give a weekly attendance, on account of the uncertainty of the supplies. The expenses being materially different, as with the salesman's commission, they are more than three or to five. Consequently, that fat flock-may in many cases, where only a few, or what are termed small lots, are to be disposed of, be sold at home with less expense than having them sent to distant markets; but that with large lots, the latter mode must be had recourse to, as more certain, expedients, and convenient. Upon the whole, the facts which have been stated fully shew that the advantages of the grazing system must be materially different under different circumstances, and be greatly influenced by those of a local kind. It has indeed been remarked by a Kentish grazier, that the profits of no two grazing farmers are exactly "alike on the same given quantity of land," nor even on the same land, as years, prices, as well as the exertions and talents of each individual, are different. In all cases, the superiority of the success must be a great measure depend upon the knowledge, exertion, and excellence of the method which is adopted by the particular farmer. Statements can of course only shew what are the general profits of the system. With meat-cattle, in the western and midland districts, they are given by Mr. Billingbye, and Mr. Young, in the Surveys under the direction of the Board of Agriculture. In this way, the former says, that a grazing farmer who has 250 acres of land, may fatten annually one hundred head of cattle, as oxen, with seven sheep and ten coals, which together may afford a comfortable but not exorbitant profit to him.
GRAZING.

Statement.

<table>
<thead>
<tr>
<th>Dr.</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>To rent of 200 acres, average value 40s. an acre</td>
<td></td>
<td></td>
<td>400 0 0</td>
</tr>
<tr>
<td>To tithe and taxes, say</td>
<td></td>
<td></td>
<td>50 0 0</td>
</tr>
<tr>
<td>Feb. To fifty oxen, at 12l.</td>
<td></td>
<td></td>
<td>550 0 0</td>
</tr>
<tr>
<td>July. To fifty oxen, at 7l.</td>
<td></td>
<td></td>
<td>350 0 0</td>
</tr>
<tr>
<td>To mowing and making fifty acres of hay, at 10s.</td>
<td></td>
<td></td>
<td>25 0 0</td>
</tr>
<tr>
<td>To skimming and making fifty acres of summer-leaze, at 3s.</td>
<td></td>
<td></td>
<td>7 10</td>
</tr>
<tr>
<td>To wages throughout the year, besides the farmer’s labour</td>
<td></td>
<td></td>
<td>50 0 0</td>
</tr>
<tr>
<td>To accidents</td>
<td></td>
<td></td>
<td>20 0 0</td>
</tr>
</tbody>
</table>

To profit (interest of capital and accidents included) | 1452 10 0 |

<table>
<thead>
<tr>
<th>Cr.</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oa. By fifty oxen, at 18l.</td>
<td>900 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May. By fifty oxen, at 13l.</td>
<td>650 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>By profit on seventy sheep, summer kept</td>
<td>40 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>By profit on ten colts</td>
<td>40 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>By profit on two hundred sheep winter fattened, and sold in April unbroken</td>
<td>100 0 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total | 1750 0 0 |

And on the rich grazing lands in Lincolnshire, according to the latter writer, the practice seems to afford a much greater advantage to the farmer; as the account, given by T. Pykell, esq. M. P. for twenty acres, in 1796,stands thus:

Statement.

<table>
<thead>
<tr>
<th>Dr.</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>To 18 heales, at 15l. each</td>
<td>216 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To 80 sheep, at 40s.</td>
<td>184 0 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Expences, viz.

<table>
<thead>
<tr>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tithe</td>
<td>1 10 0</td>
<td></td>
</tr>
<tr>
<td>Dykes-reeve</td>
<td>3 0 0</td>
<td></td>
</tr>
<tr>
<td>Rates</td>
<td>10 0 0</td>
<td></td>
</tr>
<tr>
<td>Shepherd</td>
<td>3 0 0</td>
<td></td>
</tr>
<tr>
<td>Expences</td>
<td>5 0 0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los, supposed one sheep</td>
<td>22 10 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 6 0</td>
<td></td>
</tr>
<tr>
<td>Intered one year</td>
<td>424 16 0</td>
<td></td>
</tr>
<tr>
<td>One year’s rent</td>
<td>21 0 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 0 0</td>
<td></td>
</tr>
<tr>
<td>Hire of a close for the winter, for 35 sheep</td>
<td>526 0 0</td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td>17 10 0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>523 10 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>87 0 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>610 14 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

And that “the difference between the buying and selling price, los’s deducted, 200l. 8s., is the produce of the land, or 16l. 6s. per acre, which is very great indeed, and shows that this land would let at 5l. 2s. an acre, supposing this year to be an average one.”

“This difference of rent would deduct 44l. from the profit of 87l. and leave 43l., which, with 21l charged, make 65l. interest on the year’s advance of 546, or 11½ per cent.”

But in the system of grazing pursued in some of the southern rich marshy districts with sheep, as stated some time ago, the amount stands as below, according to Mr. Price; but at present the profit must be much higher, from the improved management of the Romney Marsh graziers in general.

Account of Stock bought in for Fifty Acres of Pasture Land, for the Year 1778.

<table>
<thead>
<tr>
<th>Cr.</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>310 barren ewes, at 1l. 1s. each</td>
<td>355 10 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>93 South Down wethers, at do.</td>
<td>94 10 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 fleec rams</td>
<td>98 15 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Suffolk oxen</td>
<td>115 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Steer rams</td>
<td>40 10 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rent, at 32s. per acre</td>
<td>75 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expences, at 5s. per acre</td>
<td>12 10 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total | 770 15 0 |

Stock sold off Fifty Acres of Pasture Land, in the Year 1783–89.

<table>
<thead>
<tr>
<th>Cr.</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>310 barren ewes, at 3l. 1s. each</td>
<td>480 10 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>93 South Down wethers, at do.</td>
<td>139 10 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 fleec rams, at 1l. 6s. each</td>
<td>130 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Suffolk oxen, at 1l. 11s. each</td>
<td>150 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 ditto, to keep 18 weeks, at 2s. per week each</td>
<td>18 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 fleec rams, sold at 9l. each</td>
<td>72 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 ditto, to keep 12 weeks, at 1s. 6d. per week each</td>
<td>1 16 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 packs 3 draughts of long wool at 8/. 10s.</td>
<td>74 7 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½ ditto of fine wool, at 12l.</td>
<td>18 0 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total | 1084 3 6 |
Deduct | 779 15 0 |
Clear profit | 313 8 6 |

Profits on Fattening Land, allowing 12s. for each Sheep.

One acre.

<table>
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<th>£.</th>
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<tr>
<td>Winter, 2 barren ewes, off in May</td>
<td>1 0 0</td>
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<tr>
<td>Summer, 5 wethers, off at Michaelmas</td>
<td>2 0 0</td>
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<tr>
<td>Wool of 7 sheep, at 12l. per pack</td>
<td>2 2 0</td>
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<tr>
<td>One bullock to fat</td>
<td>3 0 0</td>
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<td>8 12 0</td>
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Rent:
GRAZING.

Brought over

£.  s. d.  £. t. d.
Rent 1 10 0
Expences 0 5 0
Affeles and taxes 0 5 0

Clear profit 2 0 0

One acre.
Three wethers, on at Michaelmas
Two ditto, in May
Wood
One bullock to fat

Rent, &c. as before 1 10 0
Clear profit 2 0 0

Profits on Breeding Land.

One acre.

Winters, 2½ ewes and 3 lambs, at 14s. 2 2 0
Wood of 2½ ewes 0 13 0
Wood of 3 lambs 0 4 6
Wood of one tog 0 4 6
The summer improvement of do. 0 5 0
Jotul bullock keep 0 10 0

Rent 1 0 0
Expences 0 5 0
One in twenty los by deaths 0 7 0

Clear profit 1 1 2 0

It is remarked, "on the first of these statements, that the year was favourable for vegetation; and that such profits could not probably be made seven years together, which is the most accurate method of calculating profits on land. There being no affeles on the land, also, makes it more profitable." And further, that two modes in respect to the profits on fattening land are stated; the first used by the best graziers; the other, the most common: some take bullocks in to keep, others buy rents; the profits of which must depend on their judgment, but 3½ is the medium profit between the whole; 1½ each sheep is generally allowed as the gained profit by fattening. It is added that "it cannot be supposed that this profit will always amount to so much as the years differ; therefore dry fees will abate it, and a large tract of land cannot have the supply of flock to make it so great. There are losses to be taken out; but, upon the whole, it is very profitable, as the expenses are so moderate, that one servant-man can manage a thousand acres of pasture land. The value or rent of land is put too low, except for long leases unemployed, or where a large quantity of land is taken. The average price of rent is from 4½ to 5½ for fattening land, unless four or five hundred acres of breeding and fattening, perhaps about 3½; and some old leas 1½ breeding land."

It is stated that where sheep, in order to fatten them in a more expeditious manner, or to finish them in the field, where the grass is insufficient for the purpose, have the addition of turnips or other sorts of luxuriant green food, great care should be taken; by the grazier, that a due proportion of some sort of dry material be had recourse to at the same time; as without such precaution, not only mows but may be sustained by the death of some of the sheep in particular instances, but by their making less progress in becoming fat than would otherwise be the case. Hay, cut stuff, bran, or a few oats, answer the purpose very well. See Sowing.

It is necessary, in order that the consumption of these sorts of food may be conducted in the most economical manner, that proper troughs, racks, crib, or baskets, should be provided, and fixed in such a way, that they cannot be overturned. The graziers, in some parts of Lincolnshire, have a large sort of crib or wicker-work bucket, being eight or ten feet in circumference, and wattled to the height of one foot or a foot and a half, in a close manner, and then left open at about a foot and a half; after which it is closely wattled again for nearly a foot, being drawn in in a narrowing manner at the top, so as to have only proper room for introducing the food. The rails of the frames are placed about eight or ten inches apart, which admit of the sheep feeding in a distinct manner. It is described in the fourth volume of the third series of the Repertory of Arts, &c. and denominated a tumbrid. It may be seen at fig. 8, in the Plate on Granaries. This contrivance affords much advantage, both in the faving of food from being wasted, and in affording the leas sheep an opportunity of feeding without being disturbed or driven away by the strong ones, and consequently much injured.

In the Rural Economy of the Midland Counties, it is noticed in respect to the practice of grazing in such seasons as are very wet, that an incident of this sort that occurred to the writer in the very wet autumn of 1789 is interrelling. "The general complaint is, that grazing stock, though they have this year rolled in grass, have not done well; Mr. Henton, of Hoby in Leicester, being singular in laying it to the choice of his feeders, and done tolerably. Indeed his flock corrobates his assertion. He had a lot of cows at Loughborough, the 12th of August, the fattest in the show. "But his management is more remarkable than his success." He "foddered them with hay all the wet weather; that is, he mowed the broken grass for them, beginning under the hedges, and continuing to move the coarsest patches throughout the piece. "The first day (the day it was mown), the cattle feldom this touched it; but the second or third day; they fell to it freely, eating it "between whales," in preference to grass. In the morning, it was always the first thing they filled their bellies with. "The cattle having eaten up the more palatable parts of the herbage, the thistles, and other offal, were raked up, and carried off the ground: most excellent management! "This Stock committed of about fifty head. At first one man only was employed in moving, &c. But, before the rainy weather ceased, he set on another man. "What an admirable thought! that which other men suffered to stand waste in itself, an encumbrance to the ground, and a nursery of weeds, was converted to food, more nutritious, in a wet season, than the best of the standing herbage."

Mr. Parkinson of Lincolnshire, had made a practical obser-
ferration, which is, that "the less sheep are changed, the better." It demands the farmer's attention, as the saving of the injury of flocking in many cases. And it is noticed, that the grazing on rough land, Mr. Marshall remarks, that "the fairs at Birmingham are among the worst in the country for fat stock; the butchers giving the grazers no encouragement to drive their flock to them, preferring the toll of riding twenty, thirty, or perhaps forty, miles from home to pick up their "fat!"" paying a principal part of their time and their profits in an employment truly ridiculous. How convenient it would be to the grazer, as well as to the butcher, to have a weekly market, a Smithfield at or near Birmingham! to the grazer, in thereby having a constant and certain market whenever he wanted either keep or money; and, to the butcher, in saving time and travelling expenses. Yet the few animals which are taken there at present, are frequently driven out of bounds. But Thursday, which is the ordinary market-day, is improper. Monday or Tuesday would be a more suitable day; and Sutton, perhaps, the most suitable place. In performing the business of purchasing in flock, the nearfell fairs are always to be preferred, if it can be done there with propriety; as much injury and loss is frequently sustained by driving from a considerable distance.

And the business of grazing other kinds of animals may, in some cases, be a profitable concern, but must always be regulated by the nature of the land and circumstances of the farmer. Where he has a considerable extent of the more coarse part of the pastures, he may often find it advantageous to graze young horfes, especially where he has the convenience of breeding them likewise. But though it is a practice sometimes followed by grazing farmers, to admit horfes in the same pastures with the other flock, it should certainly be avoided as much as possible, as they are very injurious by teasing and driving the fattening cattle about, and preventing their feeding so much as is otherwise the case. It is a better method to let them follow this flock off flock. When the flocks are admitted upon the grazing lands in Somersetshire, it is seldom done in a larger proportion than that of one to twenty acres. But there is another animal which it has long been a practice in particular situations to graze. This is the hog, which, where the farmer has a piece of rich grafs, either of the artificial or natural kind, he may turn upon it with much advantage. With clover, and some other artificial grafs, the animals are found to succeed perfectly well in this sort of management; but it is objectionable as loosing a vast fourteenth of manure of an excellent kind. When the field is so stocked as that the hogs can return in the evenings to the well littered fities, it may, however, be a highly benefial fystem of practice. There can be no doubt but that this sort of management might be much more extensively employed with this animal, and that thereby much of the food of ilore pigs might be saved. See Hog.

GRAZIOSO, ItaL. Graziosifem Fr. graceful, are terms in Artists, addressed to the performer; but if the composition is devoid of grace, the term can convey no instruction to the performer. It is in vain for the composer to sit down with a resolution to compose a graceful movement; it must come unfeigned, and infenibly.

Marmontel has defined grace in poetry, grace in attitudes, grace in motion, grace in the arrangement of words in prose, of figures in painting, as a poling, a lacquer, a varnish, a gilding to every human action; without which we may be surprised and entertained, but never perfectly pleased.

No poet, perhaps, abounds in grace and facility so much as Metafilho; for examples, see his cantatas.

Among musical composers, perhaps, none have been more gifted with this charm than Pergolesi, Sacchini, and Cimarosa.

The time of a grazioso movement is nearly the same as andante; smooth, gentle, and inclined to piano; no coarse strokes of the bow on the violin, or dry cocs de ligne on the G flute, except, to vary the expression and effect, the composer indicates the contrary.

GRAZZANO, in Geography, a town of Italy; 15 miles N.S.W. of Verona.

GRAZZINI, Gio. Paolo, of Ferrara, in Biography, left the profession of goldsmith to become a painter at an advanced period of his life; his chief instructions he owed to the friendship of Carlo Bonone. The first specimen of his capacity was a picture of St. Eligio placed in the goldsmith's hall of Ferrara. Eight years which he had employed to finish the work were amply redeemed by the display of a master hand, and a tone of colour that pleased him near in rank to Porpora, and allommed all Ferrara, who had known Grazzini for half a century. He continued to produce works of less compass, but of equal taste, which are met with in private collections. He died in 1632. Rufii's Pilgritt.

GRAZZINI, Anthony Francis, surname Il Lofa, an Italian writer, was born at l Florence in 1553, and is known to posterity as a considerable writer in prose and verse. He is particularly remembered for his light and jocose poems, among which are many of the Cant Carminalefchi, or Carnival songs. Thefe, it is said, were first invented by Lorenzo de Medici, and a collection of them was published by Grazzini at Florence in 1559. His other works are as follows: "La Guerra de Molin, poema giocole," 1584. "Stanza," &c. "Comedie VII," "Il Lofa, Dialogo," &c.; "Lettera," "Orazione," &c. Rive, Novelle XI. The last was an extremely popular work, and as a novel it Grazzini was thought to be a worthy rival of Boccaccio in the elegance of his narration and purity of his style. He was one of the founders of the academy Della Crusca.

MORERI.

GREASE, among Furriers, &c. an inflammation and swelling of the heels about the fetlocks, and sometimes of the legs of a horse, as high as the knee or hock, with the seer of an oily matter, to which the disease owes its name. The matter discharged from the heels has a peculiar offensive smell, and the heels themselves are sometimes ulcerated. Heavy horfes, with round fliny legs, are the most subject to this disorder, and the white legs more than the rest. It is almost always found in the posterior extremities.

Grease is occasioned by sudden changes from a cold to a hot temperature, such as the removing of horfes from grafs into hot stables; from the too sudden change of a generous to an impoverishing diet; from neglect on the part of grooms in leaving the heels wet and full of sand; and from constitutional debility. On the approach of this disease, and for several days before any very considerable appearances of swelling and inflammation, the animal seems to feel much pain in the affected heel, which is indicated by his rating it frequently from the ground, and his not being able to rest upon it without uneasiness. At this early period, the disorder may in general he removed by a poultice of boiled bran and indeed powder constantly applied to the part, and kept moist with warm water; giving every night, or every second night, a mild diuretic. When the inflammation and swelling are consider-
GREASE.

able, the fore-mentioned poultice may be used, and a strong diuretic, or a purgative may be administered as long as the cafe seems to require it. When the swelling and inflammation have abated, which will commonly happen in three or four days, the poultice may be discontinued, and the following astringent lotion may be applied five or six times a day.

Forms of astringent lotion, viz. No. 1. Alum powdered, 1 oz., vitriolic acid, 1 dr., and water, 1 pint. No. 2. Alum powdered, 3 oz., vitriolated copper, 3 oz., and water, 3 pint. No. 3. Sugar of lead, 3 oz., vinegar, 6 oz., water, 1 quart. In each of these recipes mix the ingredients. Some alteration may be necessary, according to the strength of the lotion. If the inflammation and irritability of the part are considerable, they must be diluted with an equal quantity of water; but if the inflammation be subdued, and a swelling and ulceration remain, the astringent cannot be made too strong. If the heels be ulcerated, and especially if they appear foul and have an offensive smell, one or other of the following astringent ointments should be applied to the uces, viz. No. 1. Hog's lard, 4 oz., oil of turpentine, 2 dr., and water of acetated litharge, 8 oz. No. 2. Venice turpentine, 1 oz., hog's lard, 4 oz., and alum finely powdered, 1 oz. Mix the respective ingredients. If the ulcers be deep, and do not readily heal, they should be washed with the detergent lotion previously to each dressing. Regular exercise on clean and dry ground is of the highest importance. In flight cafes of grease, the astringent lotion and a few diuretic balls will generally effect a cure; but if the disease be of long standing, and more especially if the horse has had it before, it will be more difficult to remove it. In such cases an alternative, in the nature of a powder, compounded of powdered refined niter of each 4 ounces, mixed and divided into 8 doses, should be given in the corn every day, until it produces a considerable diuretic effect.

In very obilinate cafes, roves in the thigh have been found useful. Digitalis, or fox-glove, has been recommended in those swellings of the legs which are the consequences of grease; but as this is a violent medicine, and apt to injure the stomach, it should be cautiously administered; the dose is from half a dram to one dram. When a horse has suffered much from this disease, and appears to be weak and out of condition, a liberal allowance of corn will tend to recover him, especially if it be diluted by the astringent lotion, and careful grooming. In cases of this kind exercise is indispensable. When the disease depends upon debility it is obvious that a dose of physic would be improper; but considerable benefit has sometimes attended the exhibition every morning, till the bowels are moderately opened, of the following alternative; viz. ficcureine aces, 1 oz., calafe sop, 1 oz, powdered ginger and myrrh, of each 4 oz. Form these into a mass with sugar, and divide it into 5 balls. This remedy, though of an opening quality, will improve the horse's strength, and at the same time promote abstraction. Or the following preparation may be administered; viz. antimony, finely powdered, and flowers of sulphur, of each 6 oz.; lutein powder, 2 oz.; and honey sufficient to form a mass for 2 balls; one of which may be given once or twice a day.

Nothing tends so much to prevent grease and swelling of the legs as frequent hand-rubbing, and cleaning the heels carefully, as soon as a horse comes in from exercise. Initerate cafes of grease, where the disease appears to be in some degree habitual, a run at grafts is the only remedy. If a dry paddock can be procured where the horse may be sheltered in bad weather, it will be found very convenient; for thus circumstanced the horse may perform his usual labour, and be kept free from the complaint. In the earlier stages of the disease, the practice of turning the horse into a fatt-marsh is serviceable: and a few months' run on a salt-marsh has frequently eradicated the disorder, when other remedies have failed. Obstinate cafes of grease may very frequently be cured by withholding the horse's allowance of water for two days, or even a longer time, and then riding him into the sea or salt water, when his thirst will induce him to drink freely; and the salt water will act as an useful laxative and alterative. This process must be frequently repeated, whenever it does not appear to be injurious in any material respect. In a few obstinate cafes, Mr. White says (Treatise on Veterinary Medicine,) that he has often merited all service, giving one ball every morning, until the bowels are opened: it is formed of calcined, 4 dr., aces, 1 dr., Castile soap, 2 dr., and oil of Juniper, 30 drops, made into a ball with syrup for one dose. In the treatment of these ulcers, or "cracks," as they are often termed, which particularly occur in the back part of the patellas, and which are of difficult cure, cleanliness is of great importance; and when they appear inflamed and painful, it will be useful to apply a soft poultice, in which a little Goulard has been mixed, for two or three days. The following ointment, viz. fresh hog's lard, 4 oz. and white lead finely powdered, 1 oz. mixed, may then be applied, spread on tow, and fixed with a light thin bandage. If cracks or ulcers appear in the heels, without that general swelling of the legs and discharge of matter, which constitute the disease named grease, they may besoon cured by applying the astringent ointment, and giving a few doses of diuretic alteratives; but when these are accompanied by the grease, laxatives or purgatives are necessary, according to the condition of the horse. In obilinate cafes, the matter discharged is made of hog's lard, 4 oz. palm oil, 2 oz. and fine olive oil, 1 oz. melted by placing the pot which contains it in boiling water, and, when melted, stirring in 1 oz. of the water of acetated litharge, and continuing to stir it till the mixture is nearly cold. If the ulcers are deep, the horse should be kept in the stable till they are nearly healed, with a cooling opening diet; and his legs should be frequently and briskly rubbed with the hand; and a few of the diuretic alterative powders should be given. When proud flesh, as it is called, appears in the ulcers, it must be destroyed by cauteries, such as blue vitriol powdered, or distilled in warm water, or tannin cautery. When this is neglected, they function more to a large size, and become devoid of a firm consistence, in which state they are commonly named "grapes.

In recent cafes of grease, in which the heels are inflamed and swollen, and discharge a whitish-coloured matter, much benefit has resulted from fomenting them for a considerable time with warm water, in which a small quantity of Goulard has been mixed, and immediately applying the Goulard poultice. In obilinate cafes of grease, the matter discharged is very solid; the fomenting practice is useful; that is, a poultice of linseed meal, warm water, and yeal, which soon restores the offensive smell, and causes a dry scurfy matter to be formed. Powdered charcoal has also been recommended for the same purpose. In recent cafes the Goulard poultice and cold purgatives will soon reduce the inflammation considerably; and then the cure is easily accomplished by astringent lotions. For preventing a return of the complaint, exercise and good grooming are indispensably necessary; frequent hand rubbing of the legs, and a diuretic powder occasionally, are also useful. Horses with white binder legs, or such as are much exposed to swelling of the legs, should be bandaged for some time, particularly after hard work, keeping the bandage constantly moist with a solution of alum and water. In some cafes of grease the inflammation seems to extend to the cellular membrane under the skin, the consequence of which
which is a more severe pain and lamenefs than when it is superiour. The inflammation generally terminates in an abscess of the heel, which bursts and leaves a deep ill-looking ulcer. Although the general swelling of the legs subsides, the ulcer is extremely irritable, and healed with difficulty, particularly if the horse be exercised. By applying poultices and warm digestive ointment, and by keeping the horse at rest, the ulcer gradually heals. When ulcers of the heel do not appear disposed to heal, the adherent ointment above-mentioned should be changed for the following, which is more stimulant, and previously to its application, the foot should be washed with a solution of blue vitriol. The stimulating ointment is prepared by mixing ointment of yellow rhubarb, 4 oz. olive oil ½ oz. and red nitrate of silver in fine powder ½ oz. See White’s Treatise of Veterinary Medicine, vol. 1.

If the griece be an attendant of some other disease, it will be in vain to attempt the cure before the diseafe be removed, that is the original cause of it. Therefore, if it be a hectic, the yellows, or the feirin, &c. the directions given for those difeafes are to be followed, and in the mean time proper applications are to be used outwardly for the griece.

Grease, Molten, a difaife of the intellines, incident to hores, and generally dependent on some constitutional affection. Horses that have been well fed, without much exercise, are peculiarly subject to this complaint; although they appear sleek and fat, they are not fit for violent or long-continued exertion, unless they have been brought to it gradually; and therefore when they are put to work in this state, and violently exercised, a fever often ensues; and this fever commonly depends upon general inflammation or increased action of the whole arterial system. In this disease, nature makes an effort to remove it by a violent purging; and the mucus, formed on the inner surface of the bowels for the purposes of lubricating and protecting them from the action of any acrimonious matter that may happen to be passing through them, being now so abundant, appears somewhat like fat mixed with the dung. When blood is drawn from a horse in this state, a large quantity of inflammatory bruised lymph, or buff-coloured jelly, appears on its surface. Such is the account which Mr. White gives of this disease, and he explains the account of those veterinary writers who represent molten greece as consisting in a colliquation or general making of the fat of the body, great part of which is absorbed, and thrown upon the blood and upon the intellines, whence it is voided with the excrement. Nor does he approve of the description of this disease, given by Mr. Baving, in his Treatise on Veterinary Medicine, who considers it to be the same with the human dysentery. In the course of a ten years’ extensive practice, he says that he has never met with a single case that resembled the dysentery described by medical authors. “I have often observed,” says this writer, “during the progress of symptomatic fever, internal inflammation, mucus mixed with the dung, which had sometimes the appearance of part of one of those long white worms so often found in the horse’s bowels; at others it resembled a membrane. I have observed the same thing in horses of great bodily health, or after the operation of a violent physic. I have also seen many cases where there was tenesmus or considerable irritation in the rectum; the horse frequently voiding a small quantity of dung, and appearing in pain. But this was always a symptom of some more important complaint, and easily removed, or the effect of physic, and very unlike dysentery.” Molten greece, according to Mr. White, is not to be considered as a distinct disease, but merely as a symptom, sometimes appearing in general inflammation, but more frequently in fevers. In either of these cases some of the internal organs are more affected than others. When a difficulty of breathing occurs, indicated by an unusually quick motion of the flanks and expansion of the nostrils, it is a sign of an affection of the lungs. When molten greece appears, it shews that the mucous membrane of the bowels is more particularly affected; sometimes both these parts are affected at the same time. The principal remedy in this diseafe is copious bleeding, according to age, strength, and other circumstances of the case. It is often necessary to repeat the operation of bleeding; and if the disaife appears to be principally feated in the lungs, only laxatives should be administered and bowels infibted in the chest and belly; the fides also may be blifled, or the multbard embrocation rubbed on the fides and belly. In mole of greece, or when the bowels are affected, if a copious purging occurs, it should not be suppressed, but encouraged, by giving frequent decoctions of bath, gum arabic dissolved in water, flarch, or the powder of arrow root, and boiled in water. When the dung is voided sparingly, but frequently, and particularly when any worms are mixed with it, let a pint of calfer oil be given, which may be repeated, if necessary, about two days. In this case it will be proper to rub the multbard embrocation on the belly. If the diseafe con- tinue, and especifally if there be considerable irritation about the anus; the horse frequently ejecting a small quantity of excrement, and appearing to be in great pain, the following opiate clyfter may be given. viz. opium 1 dram, warm water 8 oz. mixed, to which add about a quart of flarch water, i. e. flarch boiled in water, of a proper confequence for a clyfter. If the exhibition of a clyfter seems rather to increase than alleviate the pain and irritation, the dofe of calfer oil must be repeated, and a clyfter thrown up only of water gruel or a little oil. As the gut in this case is very tender and irritable, the clyfter pipe should not be rough, and it should be introduced with caution; it should therefore be perfectly smooth, covered with oil or hard, and not protruded with violence. It is probable, says Mr. White, that a small, short tube of bone, about three times the bulk and length of the pipe used in human subject, would be preferable in this occasion to that which is commonly employed. White’s Treatise of Veterinary Medicine, vol. 1.

Grain, among Hunters, denotes the fat of a bear or hare.

Greasy, in Agriculture, a term provincially made use of to imply any thing foul, whether in animals or land. It is frequently used figuratively, in matters of mortality, &c. to signify any thing affected, diseased, peculiar, important, &c. Thus we say, Shakespeare was a great genius; queen Elizabeth had a great soul; Cromwell was a man of great designs; Da Vinci, a great painter; Galileo, a great philosopher; Buffon, a great critic, &c.

Great: a term of comparison, denoting a thing to have more extent than some other to which it is referred. Thus we say, a great space; a great distance; a great figure, a great body, &c. See Comparison.

Great’s likewise used figuratively, in matters of mortality, &c. to signify any thing large, elevated, extraordinary, important, &c. Thus we say, Shakespeare was a great genius; queen Elizabeth had a great soul; Cromwell was a man of great designs; Da Vinci, a great painter; Galileo, a great philosopher; Buffon, a great critic, &c.

Great is also a title or quality appropriated to certain princes, and other illustrious personages. Thus we say the great Turk; the great Mogul; the great Khan of Tartary; the great Duke of Florence, &c.

Great is also a surname bestowed on several kings and emperors. Thus we say, Alexander the great, Cyrus the great; Charles the great, or Charlemagne; Henry the great.
Great Britain

of France, &c. So the English frequently say, Edward the great, or the great Edward; William the great, meaning King William III. or the great William. The French say Louis the great, le grand, speaking of Louis XIV. of Paris says, Charlemagne first got the surname great from the tallness and eminence of his stature. Helgaud adds, that Hugh the great of France was thus denominated on account of his great pith, goodness, &c.

Great is also applied to several officers who have pre-eminence over others. Thus we say, the lord great chamberlain; the great marshal of Poland, &c.

Great Circles of the Sphere. See Great Circle.

Great Circle sailing. See Sailing.

Great Apparatus. See Apparatus.

Great Artery. See Artery.

Great Britain. See Barm.

Great Bank of Newfoundland, in Geography. See Bank.

It lies between 41 and 50° 24' N. lat., and between 49 45', and 54 45' W. long.

Great Barrington. See Barrington. The number of inhabitants by a late estimate is 1754.

Great Bay, a bay of North America, at the mouth of the Piscataqua river, between Portsmouth and Exeter, in the flate of New Hampshire.

Great Bear lake. See Bear lake.

Great Bear. See Ursus major.

Great Cape, in Geography, a Cape of Upper Canada, where lake Superior descends into the narrows of the fall St. Mary.

Great Diocletian. See Diocletian.

Great Egg Harbour, &c. in Geography. See Egg Harbour river.

Great Fanning, a river of America, in New York, which runs in the mountains near the source of the river Oneida, and runs N. W. by W. to lake Ontario.


Great Intervals, in Music, signify the fame, with Holden and some other writers, as greater and major do with the generality of musicians, and is applied to the intervals marked with Roman capitals, as II, III, V, VI, VII, &c. See Great.

Great Island, in Geography, a small island in the East Indian sea, near the N. coast of the island of Flores. S. lat. 7 59'. E. long. 120 54'.—Also, an island in the river Nicaragua, between lake Erie and lake Ontario. N. lat. 53'. W. long. 78° 59'.—Also, an island of Ireland, in the county of Cork, being the larges of the islands formed by the river Lee in Cork harbour; on it is the flourishing town of Cove.

—Also, an island in Piscataqua harbour, New Hampshire, in the United States.

Great Kanawha. See Kanawha.

Great Letters. See Capitals.

Great Maps. See Map.

Great Meca. See Mecatia.

Great Octave, in Music, is applied by the Germans, according to their tablature, or notation of musical notes, to the octave, or rather septave, beginning with C on the second fager line below the half flat, and ending with B on the second line, or B of Guido, and to which they exclusively apply the Roman capitals C, D, E, F, G, A, B. See Dr. Calle:ott's Musical Grammar, art. 34. See also Small Octave, Once-marked Octave, and Twice-marked Octave.

The object of this tablature is, to enable musical notes to be written or printed without eles or lines and spaces in a slaver.

Great Officer. See Officer.

Great Pelican Island. See Pelican.

Great Repeat. See Repeat.

Great Ridge, in Geography, one of the ridges of the Alleghany mountains, which separates the waters of the Savannah and Alatamaha. At the S. E. promontory of this ridge is that extraordinary place called Buffaloe lick, distant about 80 miles from Augusta. It occupies several acres of ground. A large cane swamp and meadows, forming an immense plain, lies S. E. of it, and in this swamp Mr. Bartram apprehends that the branches of the great Ogeechee take their rise. The lick is nearly level, and lies between the head of the cane swamp and the ascent of the ridge.

Great River, a river of Virginia, which runs into the Staunton river. N. lat. 36° 46'. W. long. 79° 12'.—Alfo, a river of Canada, which runs into the river St. Lawrence, 20 miles below Quebec.

Great River. See Rio Grande.

Great Scale, in Music. The late Sir Marmaduke Overend, after a life almost spent in researches into the nature and proportion of musical intervals, succeeded, to the satisfaction of Dr. Boyce, his intimate friend, to whom his labours were submitted, in unravelling the mysteries of the Greek scales of music, as they fays, in a paper on the great scale, in his quarto manuscripts, vol. ii. page 113 to 133, now in the library of the Royal Institution, which is thus entitled, viz. "All the Greek scales of music combined, with the diatonic intence, extended in the acumen and gravitas, with their reminiscences and intentions to double flats and double sharps in each; still refined, elucidated, and calculated, by Marmaduke Overend, Edwaford 1779." In pages 143 to 149 of the fame volume of MS. we find also the several ratios of this scale in their least terms, and the indices of the component primes, of one octave of the acumen and the gravitas with the fynemonens, the reminiscence, &c. This scale, which contains 86 notes within the octave, is a great musical curiosity, which we are sorry that our limits will not admit of inferring by the notice here taken of it, the curious may refer to the manuscripts themselves for further satisfaction. See Greek Scale.

Great Seal. See Seal.

Great Sixth, Redundant, in Music, or redundant great fifth, according to Holden, is the inversion of the deficient less third of his scales (.), and has a ratio of \( \frac{475}{54769} \times 9f + 41m \) in Farey's notation, its common logarithm being \( 0.76591678566 \), its Euler's log. or decimal of the octave \( -7.7765775 \), and it contains 43-3868 major commas. This interval does not belong to the received or diatonic system, having the number 7 in its ratio.

Great Sodus. See Sodus.

Great Third, in Music, probably according to Holden's new and fanciful system, is the ratio which the mind "probably" conceives (page 37 of his "Effay") as pertaining to the major third in the common chord minor, and to which he assigns the numbers \( \frac{7}{7} \), \( 260.2750822 + 4f + 18m \) in the new notation; its common logarithm is \( 0.8934235924 \) and that of Euler, \( 0.3378230 \); it also contains 15-20576 major commas; it is far removed from the received or diatonic system of intervals, as involving the prime number 19, and yet it is one of those which result from earl Stanhope's directions for tuning; it is the larger equal-feeding binaral third of his lordship, see Equal Tuning. Mr. Holden, at page 584 of his effay, relates an experiment in which this third proved an "intermediate discord," which is more than might be expected, from the temperament of rather more than 7,ths of a comma, which it has.

Great Tubbs. See Tubbs.

Great Wardrobe. See Wardrobe.

Great...
Great Wheel, in Greek or Watch-work, is that wheel which the weight, spring, or fusee, first moves. Great Work, in Chymistry, is the alchemical process whereby gold is made, or pretended to be made. Great Year. See Platonic year. GREATER Barons. See Baron. GREATER Enharmonic thief. See DIESIS. GREATER Excommunication. See EXCOMMUNICATION.

GREATER Fug! See FANT.
GREATER Hexarched. See HEXARCHY.
GREATER, in Music, is applied to distinguishing several intervals, whereof there are two of the same name, as greater, second-leather second; greater third, leather third; &c. Major interval is as often applied to these, and by some few writers they are called great intervals. The femtome or difference between the greater and the lesser intervals of the same names, are not equal, but of two different magnitudes, viz., the femtome minor \( \Phi = 37 \Sigma + f + 3 \), which occurs between the thirds and the sixths major and minor, and the femtome medius \( \Phi = 37 \Sigma + f + 4 \), which occurs between the seconds, fourths, fifths, and sevenths, major and minor: the difference of these femtomina being the major comm \( \Phi = 11 \Sigma + m. \)

GREATHAM Fleet, in Geography, a river of England, which rives in the county of Durham, and runs into the German sea, 5 miles S. of Hartlepool, N. lat. 54° 43'.

GREATMAN'S Bay, a bay of Ireland, on the N. coast of Galway bay; six miles N. from S. Arran isles.

GREAVES, John, in Biography, was born at Colmore, near Aldersford, in Hampshire, in the year 1622. He was educated in the churche, and in the other elementary parts of learning by his father, who was rector of the place, and the most celebrated school-maister in that country. When he was fifteen he went to Balliol college, Oxford, where he applied himself with great afflication to the studies of the place, and took his first degree in the year 1641. Three years after this he fled candidate for a fellowship of Merton college, when he was the first on the list of five who were then elected. In 1628 he took the degree of M.A., and more particularly directed his attention to the study of the mathematics and oriental learning, and became the friend of the most eminent scholars in the university, among whom were Mr. Briggs, Savilian professor of astronomy, and Mr. Peter Turner, professor of geometry in Gresham college, London. Had he wanted any motive to induce him to pursue his studies with vigour, the example of his contemporaries would have furnished that motive. Mr. Greaves read over all the writings of the most celebrated mathematicians of that and the preceding age, and he made himself familiar with the ancient Greek, Arabian, and Persian authors. In the year 1630, upon the resignation of Mr. Turner, he was elected professor of geometry at Gresham college, in consequence of the high reputation which he obtained in the university. At this period he was introduced to archbishop Laud, the chancellor of the university of Oxford, from whom he received several marks of favour. Soon after this, Mr. Greaves resolved to travel for improvement, and in 1635 we find him in Holland, attending the lectures of James Golius, professor of Arabic at Leyden; thence he proceeded to Paris; afterwards to Rome, Florence, and Padua, making exact observations upon everything deserving of notice. Upon his return he determined to take a voyage to Egypt, a design which met with the decided approbation of the archbishop. His object in this was not only to make himself acquainted with such remains of antiquity which that famous country possessed as might serve to illustrate ancient literature, but also to make astronomical and geographical observations; he therefore furnished himself with instruments of every kind for the purpose, and such printed Greek and Arabic books as he thought might be advantageously exchanged for MSS. and other objects worthy of collection. He embarked in the river Thames for Leghorn in the year 1635, accompanied by his friend Mr. Edward Pococke, and proceeded first to Italy, and thence to Constantinople, where they arrived about Michaelmas. Here he was received with great attention by Sir Peter Wych, to whom he brought out letters of recommendation from archbishop Laud. He was immediately introduced to Cyril Lucar, the Greek patriarch, who afforded him much valuable assistance in purchasing Greek MSS. The venerable patriarch promised to recommend him to the monks of mount Athos, in Macedonia, where, he said, "he would have had the liberty of entering all the libraries in that place, to have collected a catalogue of such books, as either were not printed, or else, by the help of some, there might have been more correctly set out." Thence, by dispelling with the anathemas which former patriarchs had lain upon all Greek libraries to preserve the books from the Latins, the patriarch proposed to have presented to the archbishop of Canterbury, for the better protection of his grace's designs in the edition of Greek authors, but the death of that patriarch frustrated Mr. Greaves' intention of visiting the celebrated mount, and occasioned his being a sufferer in another respect; for having procured from a Greek monastery some MSS. of the fathers, he was under the necessity of reforming them, and losing his money to avoid a greater inconvenience. Mr. Greaves, having lost his friend, determined to proceed to Egypt, but before his departure he had an opportunity of shewing his great attention to astronomical science; knowing that there would be an eclipse of the moon in the course of a few months, he furnished proper persons with convenient instruments for observing it at Constantinople, Bagdad, Smyrna, and Alexandria, and gave them necessary directions for the purpose. For his conduct in this respect Dr. Halley paid him the highest compliment by saying that a greater service could not be rendered to the science of astronomy than by taking the phases of the moon's eclipses at those places, in order to determine their longitudes, since in and near them were made all the observations by which the mean motions of the sun are limited. Mr. Greaves having finished his arrangements for this business, went by Rhodes to Egypt, and arrived there in the month of September 1638. This was the boundary of his intended journey, and here an immense field for the exercise of his inquisitive genius opened upon his view. He omitted no opportunity of examining whatever the heavens, the earth, or subterraneous parts offered him, that might be delaying of notice; but complains of having his astronomical observations frequently interrupted by the clouds and rain, which he found to be frequent, especially in the middle of winter. But what particularly engaged his attention, and employed his care, were the pyramids, of which, at that time, there was no satisfactory account before the public. This talk he undertook, and towards the close of the year 1538 he took a careful survey and measurement of them. Having gratified his curiosity, furnished his mind with a large flock of useful knowledge, and collected some Greek, Arabic, and Persian MSS., as well as ancient coins, and other varieties, he embarked at Alexandria in the month of April 1639, and arrived at Leghorn in June. He now made a second tour of Italy, which occupied him nine months. At Florence he was received with particular marks of respect by the grand-duke of Tuscany, Ferdinand II., to whom he addressed a Latin poem sent from Alexandria; and he also was permitted to

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have free access to the Medicean library, which had been refused to him as a stranger when on his former tour. From Florence he went to Rome, whence he returned to Leghorn, and embarked on board a vessel for London, with a rich cargo of MSS., gems, coins, and other valuable antiquities. Upon his arrival in England he found his native country distracted by the conflicts between the king and parliament: he was, from principle, a friend to the royal party, and involved himself in much trouble by the zeal which he displayed in that cause of monarchy, and in his attachment to archbishop Laud. Having made a short stay at Gresham college, he went to Oxford to digest and prepare his papers for publication, in which he was assisted by archbishop Usher, who had long known and esteemed him, and to which he devoted himself with much diligence on theдей. Having proceeded to London, Mr. Greaves took his professorship at Gresham college, but he was almost at the same time chosen the Savilian professor of astronomy at Oxford, and obtained likewise a royal dispensation to hold his fellowship at Merton college, on account of the diminution in his stipend as professor, arising from the circumstances of the civil war. The labours of the professorship being suspended, he proceeded with his literary avocations, and in the year 1644 translated into Latin the "Lemnata of Archimedes," correcting the diagrams, and supplying what was frequently found defective in the demonstration itself. This piece was published by Mr. Samuel Peiter in his Miscellanies, or "Mathematical Lucubrations," 1659. Mr. Greaves, about the same time, compiled "A Perilian Lexicon," out of such words as could be met with in the evangelists, the psalms, and two or three Arabian and Perilian homilies. In 1643 he drew up a scheme for gradually introducing the new or Gregorian Rite, by omitting the intercalary day of the leap year for forty years, to which scheme he was highly inclined by the king and council, and would probably have been carried into execution had the times been favourable to the innovation. In 1646 he published his work entitled "Pyramidographia," or a description of the pyramids of Egypt, and soon after a "Difcourse on the Roman Foot and Denarius," from whence, as from a common standard, the measures and weights used by the ancients may be deduced. About the year 1648, Mr. Greaves found that he should be under the necessity of resigning his professorship; he accordingly, before his interest was entirely gone, introduced a successor, viz. Mr. Seth Ward, afterwards bishop of Salisbury. He then went to London, where he married, and living upon his patrimony, devoted his time to literary labours. He published many learned works, among which was "Elementa Linguae Pericae," 1646, to which the author subjoined "Anonymous Perica Sigilis Arabum et Perfarum Astronomic." In 1653 he published an astronomical work, to which he prefixed "A Short History of the Rise and Progress of Astronomy among the Arabs," and subjoined his " Britt Tabulae." But this work, published in other works, and had prepared many more for the press, when he was attacked by a disorder that proved fatal to him. He died in the fifth year of his age. Of his learning, ingenuity, diligence, and wonderful perseverance, there is abundant evidence. He was highly esteemed by many of his most eminent contemporaries both at home and abroad; steady in his principles, and in his friendships, and his death was lamented as a real loss to science and literature. Biog. Brit.
GREEK ACCENTS. See ACCENT.
GREEK BIBLE. See BIBLE.
GREEK CHURCH. See CHURCH.
GREEK CHURCH, MUSIC OF THE. The conflict between the Greek and Roman churches, which happened in the ninth century, prevented such changes as were made in the Roman ritual, after that period, from being adopted by the Greeks; and the notation used before seems long to have continued in the East. In Rufius, however, all the rituals were called in at the beginning of the last century, and a uniform liturgy was established, in which the modern method of writing music was received. But in the Greek ikes a notation peculiar to its inhabitants is still in use, which is not only as different from our as their alphabet, but totally unlike that in the ancient mss.

In examining the most ancient of these in the Vatican library, which were written in capitals, the first notation which we could discover, consisted chiefly of accents, and when small letters were afterwards used, their accents were only dimension heightened. In the tenth and eleventh centuries they very much resembled the characters to be found in contemporary Latin missals. However, the melodies in the lower ages became more elaborate, and the notes more numerous than in those of higher antiquity.

St. John Damascenus, who lived in the eighth century, is celebrated by the writers of his life, and by ecclesiastical historians, as the compiler and reformer of chants in the Greek church, in the same manner as St. Gregory in the Roman. And Leo Allatius (De Libris Eclef. Graecorum) under the title "Octoechos" (Octoëchos: eight tones), tells us they were composed by J. Damascenus. Zarzino goes still farther, and informs us (Inquir. Harm. 420. parte. cap. viii.) that in the first ages of Christianity the ancient Greek notation by letters having been thrown aside, John Damascenus invented new characters, which he accommodated to the Greek ecclesiastical tones; and that these characters did not, like ours, merely express single sounds, but all the intervals used in melody; as a femitone, third, minor, third major, &c. ascending and descending, with their different overtones. This resembles, we think, the modern, the notation in the ecclesiastical books of the Roman church, before the time-table, and characters in preface use were invented, or, as least, generally received.

The abate Martini of Venice (see "Preface State of Music in France and Italy") having visited the Greek siles in hopes of acquiring such a knowledge of the music practised there at present, as would enable him to judge whether any of the miraculous powers attributed to it by its ancients still remained, as well as to compare its excellence with that of his own country; and as this learned and sagacious enquirer confided to us his papers on that subject, we shall communicate to our readers a sketch of their contents.

The fyllem of modern Greek notation seems much more complicated and obscure than the ancient. The characters convey nothing to the mind either by their form or names, the greatest part of which cannot be confined; and the roll are confused to no purpose. Their signification, as words, does not point out their meaning as conical characters; and all that we can discover is, that some of them seem descriptive of gesticulations such as α ἂν, ἄν, which, perhaps, directed the priest to look up, or stretch his hands towards heaven. Βλέπω, which might direct him to make the sign of the cross, or to carry the cross. νέφελος, φλέκω, ραδιείν. Indeed, it is said in the papers, that some of these characters are for the Νυμφαίος, or Λαοδεκαια, and not

GREEK MUSIC. See Μουσική, for the voice. This is the more likely, as the Greek service abounds in gesticulations and manual dexterity.

The abate was informed, that though the oriental Greeks have signs for musical sounds equivalent to ours, they fix more by tradition than science. However, the distinctions for the duration of sounds, such as our time-table, &c., are still wanting. The abate procured an extract from a tract upon the music of the modern Greeks, written by Lampadarus; but he was, or when he lived, no one could inform him. In this it appears, that the characters amount to more than fifty; among which most of the names of those musical terms, given by Du Cange, from a MS. treatise on the ecclesiastical music of the Greeks, are to be found. (Grefi. Med. et inf. Graciatis.) Du Cange, who has so amply collected and explained the characters used by the modern Greeks in chemistry, botany, astronomy, and other arts and sciences, is silent as to their musical notation; nor have we been able to acquire any information on that subject, except that with which the abate Martin has supplied us. The title of the treatise by Lampadarus is the following: Τοῦ Θεοῦ Μουσίκης. The extract from it, which is in our possession, is too long for insertion here; nor would it be of much use, could we allow it room, as no equivalents to the Greek characters are to be found in our own notation. But with respect to the author, we find among the manuscripts, which we made in the king of Sardinia’s library at Turin, an account of a Greek MS. of the fifteenth century, N. 553. b. 1. 24, in which Lampadarus is often mentioned as author of the music to the hymns and prayers it contains. Fabricius, like-wise, 1 lb. Græc. vol. ii. p. 269, 564, and 586 speaks of a MS. in the Selden collection at Oxford, and another in the Bibliotheca Library at Louvain, in which there are explanations of the notes used by the modern Greeks, and musical compositions by several authors, particularly Lampadarus. In the patriarchal church of Constantinople there are four fingers, which are placed on the right and left side of the choir; the first on the right is called δέκα, the principal finger; the first on the left άκραπόμολος, Lampadarus; the two others which fall the principals are called δόροθεις. It is probable that Lampadarus, who flourished about the year 1300, either took his name from the office he filled; or, on account of his eminence in music, that his name was given to the office.

To infer here the musical characters still used in the rituals of the Greek church of out of Ruffin, and endeavour to explain them, will perhaps be conferring but a small favour on our readers; for from the scarcity of music written in such characters, one will be their opportunities of making use of any knowledge they may acquire by the study of them, that it would be like learning a dead language in which there are no books, or a living language without the hopes of either reading or converting it.

Those readers who may be disposed of gratifying themselves in matters of curiosity, may consult Dr. Burney’s History of Music, vol. ii. p. 56; for they will find the fourteen musical characters that occur in the Greek MSS of the Evangelists, written in capitals during the seventh, eighth, and ninth centuries, though at present they are wholly unintelligible, even to the Greeks themselves. It is observable that the more ancient the MSS, the fewer and more simple are the notes; the νοῖδες Αλεξανδρειαί, in the British Museum, has none; and the Evangelist MSS in the Harleian collection, 5785, 5987, both of the tenth century, have only such as these, which were copied in Greece by the abate Martini.
GREEK MUSIC.

The "Codex Ephraemi," in the king's library at Paris, of the fifth century, has likewise the same kind of musical notes, and it is signed as a reason for the "Codex Alexandrinus," not having them, that it was written for private use, not for the service of the church.

Kircher undertakes to give his reader an idea of modern Greek music and its characters; and has indeed collected a great number of notes and their names, but pretends not to furnish equivalents in the music of the modern world. And to infest such barbarous names, and more barbarous characters here without explanation, would no more help to initiate a student in the mysteries of Greek music, than the Hebrew or Chaldee alphabet. At the first glance they very much resemble the characters used in Chorography, an art invented about two hundred years ago to delineate the figures and steps of dances. They are too numerous and complicated to be infested and explained here; however, we have given the names and component notes in the History of Music, vol. ii. p. 51. 52; by the study of which the musical reader will be able to form some idea of the melody which they are intended to express.

There are eight ascending, and six descending characters, some for single sounds, and others for wider intervals, as thirds and sixths, such as Zarlino, in the passage mentioned above, had imagined were invented by J. Damacenus; and all these have their particular Chironomia, or signs for the gestures with which the priest is to accompany the inflections of voice.

The beginning, or first note of every chant, is called Ison, which is equivalent to the key or tone in which any melody is begun.

Kircher, to whom even Egyptian hieroglyphics are easy, has resolved the names of the Greek notes into Latin. Mufurgia, ubi supra.

The abate Martini heard the Greeks, in Paschall Week, sing several tropes or modes, which they now term sylis, in four parts, in the style of Palestira; and this kind of music they call Cretan, but why, is not only to divine, unless they heard counterpart while the Venetians were masters of the island.

The abate says that he often heard the common people of Greece sing in concert, and observed that they made frequent use of the fourth, "della consonanza che noi chiamiamo oggi quarta." By this he must mean that they used it as a concord in two parts, or if there were more than two parts, in positions where our harmony forbids the use of it; otherwise it would not have affected his ear as a singularity.

The fact is curious, and we find it confirmed by Zarlino, who observed the same practice in the Greek church at Venice. The fourth, we find, was in such favour during the time of Guido, as to be preferred in difficult to every other concord, and thought to constitute the most pleasing harmony. This partiality may probably have arisen from the importance of fourths in the ancient Greek Gymn, and the want of a temperament to render thirds and sixths more agreeable; but the improvements in harmony soon brought it into disfavour in Italy; while, from a contrary cause, it has kept its ground to the present time in Greece, at least among the people. And, indeed, even in Italy, it seems to have retained a part of its ancient privileges long after the time of Guido, and when harmony was thought to be in great perfection; for Zarlino says, that Juquin, and the other old Fiendish masters, used it frequently in their compositions: "in parte grave, denza aggangranche alto intervall." The present state of Greek music, indeed, does not confirm or favour the opinion of Dr. Brown, who allerts with his usual courage, that, "about four hundred years after Guido, the daubed art once more passed over into Italy from Greece: certain Greeks, who escaped from the taking of Constantinople, brought a refined and enervate species of music to Rome, &c." As many travellers assert that the modern Greeks have no music in parts, we may suppose, that in those places where it was heard by the abate Martini, it had been brought thither by the Venetians, during the time that they had posseffions in the Archipelago.

That the Greek music has undergone many alterations since the ancient treatises that are come down to us were written, is certain from the change and increase of its vocabulary. Bryennius has given, as names of intervals, a list of barbarous terms not to be found in any preceding writer within our knowledge; and in the Greek glossary of Du Cange, and the abate Martini's papers, a great number occur that are not to be found either in writers of high antiquity, or in Byzantium.

The technical language of the Greeks has always been copious, and in music perhaps its seeming redundance is more conspicuous than in any other art or science. But in other arts and sciences words are representative of things existing; whereas, in denomiinating the tones and inflections of voice, which, to realize, require new creation, there can be no correspondence between the type and substance. The colours, the forms, and objects, which a painter wishes to represent, are: in nature; and the poet, in all the embellishment of wild enthusiasm and fervid imagination, describes what he has seen and felt, or what is to be seen and felt, and for which common language must supply him with symbols. But it has never entered the thoughts of man to give names to all the minute shades of colour between black and white, or to the gradations by which light is propagated between the time of total darkness and the sun's meridian. And yet, in a race of founds, from the lowest musical note in the human voice to the highest, where octaves are not represented by similar signs and appellatives, the names and characters must be numerous. The lines and chiefs of the European music have certainly freed it from many perplexities with which it was embarrassed, even in the artifices times of canto fermo.

But however flowery the Greeks may have made their ecclesiastical melody, or however they have multiplied its characters, the desire of permanence in the heads of the western church, with respect to all sacred matters, long kept music in the plain and simple style in which it was left by pope Gregory the Great; for we do not find, till the invention of counterpoint, that it received any material change or improvement. Our own bible and liturgy, if they remain in their present state five or six hundred years, will, perhaps, be unintelligible to the vulgar, though written in the best language of the country when they were introduced into the church. And the Greek and Roman languages, which were so well understood by the primitive Christians, became dead and obliterated degrees, to all but the learned in after ages. The preciption of change or innovation in sacred concerns which has occasioned permanence, has likewise been the cause of inlegance and obscurity.

"Peter the Great, like his predecessors, had a particular partiality for the music of the church; maintained his own choir, or faylers for divine service, and read publicly in the church the epistles and the hours, which, in that country, is permitted to be done by any layman, who delights in such exercise, as well as by the priest." (King's Rites of the Greek Church.)

Many of the kings of France not only sung in the closet, but composed hymns for it, and set them to music. (Laborde.)
GREEK MUSIC.

(Plancke.) And we have heard his present majesty, at fix o'clock prayers in St. George's chapel at Windsor, officiate alone as clerk; repeating the refponses, and reading the psalms aloud for verses, with the minister, and uttering the amen in the clerical style.

Music has been very much cultivated at Peterburgh in the Imperial chapel and metropolitan church during the last century, as well as in the theatre. And though no instruments are admitted in the Greek church except in the Sistine or pontifical chapel at Rome, yet every vocal refinement, both in composition and performance, that can with propriety be allowed in ecclesiastical music, has been received in the church service at Peterburgh, in the Imperial chapel and cathedral of which capital, near a hundred voices are daily employed; and at Moscow, in several churches, when the sovereign is there, forty or fifty.

The music of the Hymnologia of the Russian ambassador's chapel in London, is sung to figurative music in three and four parts, distinct from the intonations or canto fermo. It consists of short, elegant, and simple strains or movements, in the Italian style, in plain counterpoint, composed to Slavonian words, by Bortinianki, who was sent to Italy, early in life, by the empress Catherine, to study composition.

The taste for good music palled from the theatre to the church. The plain chant of the modern Greeks is different from that of other Christian churches. It is more varied than the Gregorian chant; and that of the hymns rather refers to the figurative music of motets, than canto fermo. The empress Elizabeth, who was well acquainted with the kind of counterpoint a capella, and had great pleasure in uniting her voice with the choir, would never allow the Italian florid song to have admission in the sacred service; but says the Gotha Almanack, in an abridged history of the music of Russia, 1772, "Italian music has invaded even the Greek church as well as the Roman." This voice of complaint borders on croaking. We have taken considerable pains to obtain information on the subject, and have heard the service of the Greek church performed in several parts of Europe; and we have been favoured with a score of some of the music in present use in that service, composed by Bortinianki, a native of Peterburgh, and find that it is neither so bold and dry as canto fermo, nor so florid and flighty as that of the Italian theatre. It is plain counterpoint, non fugato, in which the words seem well accented, the parts moving all together; so that there is measure, clearness, tranquillity, and soothed air, pure harmony, and natural and simple modulation. Nothing vulgar occurs, nor any thing to remind us of the opera house, yet the strains are not without grace or gravity. It seems to excite attention by its sweetness and simplicity, more than by the art of fugue, or extraneous modulation.

GREEK MUSIC, ANCIENT. We shall here introduce some observations on the subject, extracted from a dissertation written several years ago.

Section I.—Of the Notation or Tablature of Ancient Music, including its Scales, Intervals, Systems, and Diagrams.

The music of the ancients, according to Euclid, Alypius, and Martianus Capella, was divided into seven constituent parts: these were sounds, intervals, systems, genera, modes, mutations, and melopoin, or the composition of melody. To these divisions, which comprehended only what was denominated harmonics, or the science of music, briefly so called, were added five other requisites, no less essential for a musician to know, than the preceding seven: and these were, rhythm, or the regulation of cadences in all kinds of movement; metre, or the measure of verses; organic or the instrumental art; hypocris, or gesture; and poetic, or the composition of verses. And all to these divisions, Aristides Quintilianus, and some other musical writers, added alexiwn, or the art of singing; which, indeed, seems of more importance to music, than either the organic or hypocris art.

In order to communicate to our readers all the information we are able, upon so dark and difficult a subject, we shall consider the music of the ancient Greeks under six heads only as absolutely concern music, according to our acceptance of the word; for it is plain that several of its ancient divisions more immediately belonged to poetry. Indeed these two arts were at first intimately connected, and so dependent on each other, that rules for poetry were, in general, rules for music, and the properties and effects of both were so much confounded together, that it is extremely difficult to disentangle them.

Leaving, therefore, for the present, all other divisions, divisions, and sub-divisions, with which ancient musical treatises abound, we shall proceed to fulfil the title of this section.

In the study of modern music, the first objects of inquiry are the names by which the several sounds in the scale are expressed; and, if we regard music as a language, the scale or gamut may be called its alphabet.

Plutarch says, that it is not sufficient for a musician to know what kind of music should be set to any particular poem; he should likewise know how to write it down in all the genera, that is to say, in the diatonic or natural scale, consisting of six tones and six semitones; and the chromatic, in which the scale was divided into semitones and minor thirds; and in the enharmonic genus moving by quarter tones, and major thirds, as will be explained hereafter.

It does not appear from history, that the Egyptians, Phoenicians, Hebrews, or any ancient people, who cultivated the arts, except the Greeks and Romans, had musical characters; and these had no other symbols of sound than the letters of their alphabet, which likewise served them for arithmetical numbers and chronological dates.

As the notation of the Greeks was imagined in the fancy of the art of music, when the flute had but few holes, and the lyre but few strings, the simplicity of expressing the octave of any sound by the same sign, as in modern music, was not thought of; the most ancient and constant boundary of musical tones being the diatessaron, or fourth, the extremes of which interval were fixed, though the intermediate sounds were mutable; and in the manner of tuning they confused the difference of intervals in the several genera.

The Greek scale, as in the time of Aristoxenus, the oldest writer upon music, whose works are come down to us, extended to two octaves, and was called septuaginta, maximum immutatrix; the great, the perfect, the immutable syllem; because its extremities formed a perfect consonance, including all the simple, double, direct, and inverted concords, with all the particular syllemis; and it was the opinion of the ancients that this disdiapason, or double octave, was the greatest interval which could be received in melody.

This whole syllem was composed of five tetradecachords, or different series of four sounds, and one note added at the bottom of the scale to complete the double octave; whence the figuring which produced this sound was called 

\[
\text{αναβαλλωμενος, or note suffixed to the scale; for though this}
\]

was constantly the lowest found in all the modes, it was not included in the tetrachords.

All these sounds had different denominations in the syllern, like our gamut, A re, B mi, C fa ut, &c. besides two different characters, one vocal, and the other instrumental, appropriated to each found in the several modes and genera, for the purpose of writing down melodies.

That the fourth was a favourite and important interval in
Greek Music.

The music of the ancients, is plain from the great system of two octaves having been composed of five of these tetrachords, in the same manner as the scale of Guido is of different hexachords.

The first tetrachord is called by the Greek musicians hypaton, or principal; the sounds of which are denominated:

1. Hypate hypaton, principal of principals;
2. Parypate hypaton, next the principal;
3. Hypate melos, or index of principals; from its being played with the index or fore-finger. This third sound of the first tetrachord in the diatonic genus was likewise called hypaton diatonic.
4. Hypate melos, or principal of the middle or mean tetrachord; for this sound not only served as the last or highest note of the first tetrachord, but as the first or lowest of the second; whence these two tetrachords were called conjoint, or connected. These four denominations of the sounds in the first tetrachord may be compared with the terms B mi, C fa ut, D fol re, and E la mi, in the Guido scale; or with the sounds

\[
\begin{align*}
\text{B} & \quad \text{mi} \\
\text{C} & \quad \text{fa} \\
\text{D} & \quad \text{fol} \\
\text{E} & \quad \text{la} \\
\text{F} & \quad \text{mi} \\
\end{align*}
\]

The sounds of the melos, or middle tetrachord, were placed in the following order:

Hypate melos, or principal of the mean tetrachord;
Parypate melos, next to the middle principal;
Lithuanus melos;
Melos, or melos, as this sound completes the second tetrachord, and is the centre of the whole system. The sounds of this tetrachord correspond with those which in the base of the scale of Guido are called E la mi, F fa ut, G fol re ut, and A la mi re, which are equivalent to

\[
\begin{align*}
\text{E} & \quad \text{la} \\
\text{F} & \quad \text{fa} \\
\text{G} & \quad \text{fol} \\
\text{A} & \quad \text{la} \\
\text{B} & \quad \text{mi} \\
\end{align*}
\]

This appears from the Greek tetrachords, as well as from this example, that neither the ancients nor the early moderns admitted the sharp seventh of a key into their scales.

The fourth tetrachord, ascending, is called diezeugmenon, disjunct, or separated, as it begins at B natural, which is not a note in common with any one in the other tetrachords. But though this system of four sounds is only an octave higher than that of the first tetrachord, and though the next is but a duplicate of the second, we shall present them to the reader, as the several sounds of which they are composed have in the Greek music different denominations.

The first found of the second octave, or series of eight sounds in the ancient great system, is melos, and the first of the fourth tetrachord begins with the note

Parameles, near the melos, or middle found; the next is called

Trite diezeugmenon, or third string of this tetrachord from the top; then follows the paranome diezeugmenon; and lastly, the

Note diezeugmenon, or final found of this tetrachord;

The melos in ancient music was of equal importance with the key note in modern music: being an octave above the prollambanomenos, which was the lowest found of the ancient modes, and a kind of key note to them all.

Euclid calls melos the found by which all other founds are regulated. And Aristotele, in his XXXVIth Problem, sect. 19, says that all the tones of a scale are accommodated, or tuned, to the melos. The same author likewise tells us, Problem XX, that all melody, whether it moves above or below the melos, has a natural tendency to that found.

The third tetrachord, beginning by the last note of the second, was then called synechmenon, or connected, tetrachord; the sounds of which proceed in the following order:

Melos;
Trite synechmenon, or third string of this tetrachord from the top;
Parameles synechmenon; penultimate of this tetrachord;
Note synechmenon, half of the synechmenon tetrachord; the four sounds of which correspond with those in the centre of our gamut, that are called A la mi re, B fa, C fol fa ut, and D la fol re, or

After ascending regularly thus far, up to D, by three conjoint tetrachords, the fourth tetrachord in the great system is begun by descending a minor third to B natural, the octave above the first found of the lowest tetrachord. Something of this kind is to be found in the scale of Guido, divided into hexachords; for, after ascending six notes regularly in the durum hexachord, it is necessary to descend a major third, if we would begin the natural hexachord; and when the natural hexachord is completed, if we would begin at the melos, it can only be done by a leap of a third below.

This will best appear by an example in notes:

\[
\begin{align*}
\text{Ut} & \quad \text{re} \quad \text{mi} \quad \text{fa} \quad \text{fol} \quad \text{la} \\
\text{Ut} & \quad \text{re} \quad \text{mi} \quad \text{fa} \quad \text{fol} \quad \text{la} \\
\end{align*}
\]

The last found of the fourth tetrachord is the first of the fifth, which is called the hyperbolos, or supreme tetrachord; the sounds of which ascend in the following order:

Note diezeugmenon, half of the diezeugmenon tetrachord;
Trite hyperbolos, third string of the hyperbolos tetrachord;
Parameles hyperbolos, penultimate of the supreme tetrachord;
Note hyperbolos, half of the supreme, or highest tetrachord, and of the great system, or diagram.

This last tetrachord, being added to the scale long after its first formation, was called hyperbolos, from its founds being more acute than the rest, and beyond the common bounds.
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The ancients used likewise four different monosyllables ending with different vowels, by way of embellishment, for the exercise of the voice in singing; like our mi, fa, sol, la.

The repetition of these monosyllables is a further proof that the fourth in the ancient music served as a boundary to a system of four sounds, in the same manner as a hexachord did in the Guido scale, and as an octave does for eight sounds in the more modern practice.

Any interval between the terms of which one or more sounds intervened, was by the ancients called a system; E G, for example, constituted a system of a third minor; E A, of a fourth; E B, of a fifth, &c.

Thee smaller systems were of different species; thus there were three kinds of tetrachords, that differed in melody by the position of the femitone, which was sometimes at the beginning, sometimes at the end, and sometimes in the middle; as in the following example, where the black notes are femitones, and the white, tones.

As the Greeks used all the four and twenty letters of their alphabet for musical characters, or symbols of sound; and as their most extensive system or scale did not exceed two octaves, or fifteen sounds, it should seem as if their simple alphabet was more than sufficient to express them; for their music being at first only a notation of their poetry, the rhythm, or air, must have been determined by the metre of the verse, without the assistance of figures of proportion peculiar to music. But supposing it was necessary for them to have different characters to express the different feelings of the verse, it is certain that vocal music was in no want of them; and instrumental being chiefly vocal music played by instruments, had likewise no need of them, when the words were written, or the player knew them by heart.

However, in order to multiply these characters, the letters of their alphabet were sometimes written in capitals, and sometimes small; some were entire, some mutilated, some doubled, and some lengthened; and besides these distinctions in the form of the letters, they had others of situation, sometimes turning them to the right, sometimes to the left; sometimes inverting, and sometimes placing them horizontally; for instance, the letter gamma, by these expedients, served to express seven different sounds: T L I F N E M. Some of the letters were also barred, or accented, in order to change their symbolical import; and these still not sufficient, they made the common grave and acute accents serve as specific musical notes.

It is a matter that has been long disputed among the learned, whether accents were originally musical characters, or marks of pronunciation. It is in vain to ask what the terms of the voice, which the proofs on both sides are so numerous. (See Gally and Spelman against accents, and Prin and Forster in defence of them.) Mr. West is firmly of opinion that accents were originally musical notes, fet over words to direct the several tones and inflections of the voice, requisite to give the whole sentence its proper harmony and cadence. (Pind. vol. ii.) And the abbé du Bos, who frequently by a peremptory decision cuts the knot of such difficulties as he is unable to untie, affirms, without sufficient proof, that-as poets originally set their own verses, they placed for this purpose a figure, or accent, over each syllable. So that, according to this writer, we are at present not only in possession of the poetry of Homer, Pindar, Anacreon, and Sappho, but their metre. Why then do we complain of the total loss of Greek music? (See Reflex. Critique, c. iii. p 85.) But as music had characters different from accents so early as the time of Terpander, to whom the invention is given by the Oxford Marbles, which place this event about six hundred and seventy years before Christ; and as accents for prose or poetry are likewise proved to be of high antiquity, it seems as if there could have been no necessity for the ancients to use one for the other.

But it has already been remarked that the letters of the alphabet, though turned, distorted, and mutilated, so many different ways, were insufficient to express the sounds of all the modes in the three genera; so that recourse was had to accents, as the scale became more extended, in order to augment the number of characters. And Alipius, in the enumeration of the notes in the enigmatic genus, tells us, that tetrachordon is represented by beta and the acute accent; and tetrachordon parthiac is represented by alpha and the grave accent.

This is a proof that the accents were known at the time of Alipius, and were then used chiefly for prose, not music, for which they were only called in occasionally. Indeed they are mentioned as accentual marks by writers of much higher antiquity than Alipius; for not only Cicero and Plutarch, but Aristotle and Plato, speak of them as merely regarding the elevation and depression of the voice in speech. However, in the early Greek and Roman mists, as will be shown hereafter, the musical characters used in canto fermo, seem to have been only heightened accents.

These various modifications of letters and accents in the Greek notation composed in all one hundred and twenty different characters, which were still considerably multiplied in practice; for each of these characters serving many purposes in the vocal as well as instrumental notation, or grammat, and being changed and varied according to the different modes and genera, as the names of our notes are changed by different clefs and keys, the one hundred and twenty Greek characters produced one thousand five hundred and twenty notes.

Two rows of these characters were usually placed over or under the words of a lyric poem; the upper row serving for the voice, and the lower for instruments.

If we had not the testimony of all the Greek writers who have mentioned these characters, for their use and formation, it would be natural to suppose that the double row of different letters placed over each other, and above the words of a poem, were intended to express different parts, with respect to harmony; as with us, in modern music, the treble notes are written over the base, and the first treble over the second; but Alipius, who is extremely minute in his instructions concerning the use of these characters, in all the modes, tells us, in express terms, that the upper line of the notes is for the words, and the lower for the lyre. (Eur. 13. 74.)
GREEK MUSIC.

We are told, not only by Alypius, but by Gaudentius, p. 23, that of the two rows of letters used for musical characters, the upper is for the words, that is, *to fingen*, and the under to be played. And he afterwards proves them to have been unison to each other, both by his definitions and by placing them opposite to the name found in all the scales.

In this author, the notes of the great system of the Lydian mode in the diont tonic genus are arranged in the following order:

Z τ RΦ CΡ M I σ γ Z E σ β μ I

And these he defines in such a manner as leaves no room to doubt of the identity of their significations.

It is somewhat strange that the notes for the voice in ancient music should be placed above those for the lyre, and consequently further from the words. Meibomius, in his preface, has, however, given a curious reason for this custom, from a fragment of Bacchius, senior: "The upper line of notes is for the poem, the lower for the lyre; because the mouth, which alone gives utterance to the words, is placed by nature above the hands, which produce tones from the instrument."

Z = Proflamabamos, an imperfect Zeta, and Tau placed horizontally.

Τ Η Hypate hypaton, an averted Gamma, and a Gamma direct.

R L Parhypate hypaton, an imperfect Beta, and a Gamma inverted.

Φ Hypaton diatonos, a Phi, and a Digamma.

C C Hypate micos, Sigma and Sigma.

Φ Φ Parhypate micos, Rho, and Sigma inverted.

M Μ Micos diatonos, Mu, and a lengthened Pi.

I < Μή, Iota, and a horizontal Lambda.

θ V Trite symmenon, Theta, and an inverted Lambda.

Γ Ν Symmenon diatonos, Gamma and Nu.

ζ Ζ Symmenon micos, an inverted Omega and a Zeta.

Z = Parameko, Zeta, and Pi placed horizontally.

Π Π Trite micos, Epiloa, and an inverted Pi.

υ Z Diezeugmenon micos, as Symmenon, which was the same fling in the lyre.

ι = Diezeugmenon, horizontal Phi, and a small Eta lengthened.

ι = Trite hyperboleon, an inverted Upilox, and an imperfect Alpha.

M Μ Μ Hyperboleon diatonos, Mu, and a lengthened Pi, accepted.

ι = Νετε hyperboleon, Iota, and an accepted Lambda, placed horizontally.

It is from the indefatigable labour of the learned Meibomius, in his Commentaries upon the ancient Greek musicians, particularly Alypius, that we are able to decipher these characters; which, before his time, had been so altered, corrupted, disfigured, and confounded, by the ignorance or negligence of the transcribers of ancient manuscripts, that they were rendered wholly unintelligible.

With our utmost study, reading, and contemplation, we could reduce the Greek notation to no order, nor ascertain whether it was to be read upwards or downwards. The neglect of these distinctions will introduce an universal scepticism concerning every part of ancient music.

Galle, Zardo, Bontemp, Tevo, M. Rouffeau, Dr. Brown, and others have attempted to dignify and lower had different acceptations among the ancients, from those in which they are understood by the moderns, without guarding, as they ought to have done, against such consequences, with respect to the situation of the scale, as it was natural for the reader to draw from that assertion.

At length, an infallible rule presented itself to us in the works of the great Euclid, who has been regarded for so many ages as the legislator of mathematicians, and whose writings have been their code. In his section of the Canon, p. 57, edit. Meibom, he represents *profloamabamos* by the whole firing: so that, if any thing concerning ancient music can be made certain, it is, that this whole firing represented the lowest found in the Greek scale, which, in the Hyperborean mode, was equivalent to the note A.

Half the firing, Mefo, its octave, a,

Third part, June diezeugmenon, fifth of the octave, c,

And the fourth part of the firing, Note hyperboleon, the double octave, a,

which include all the concords that the ancients admitted. Eight ninths of the firing are allotted to the sound Hypate bardia gravitas, which is B in the scale, one tone higher than profloamabamos, or A.

This representation of the whole firing and its divisions into harmonic and aliquot parts, must put an end to every doubt concerning the order of the scale, which may have arisen from the inverted application of the words *highb* and *low*, constantly occurring in all the more ancient and authentic Greek writers on music.

Sect. II.—Of the three genera, Diatonic, Chromatic, and Enharmonic. Sec. III.—Of the Ancients. See Modes.

Sect. IV.—Of Moderns. See Mutations.

Sect. V.—Of Melopoeia. See Melopoeia.

Sect. VI.—Of Rhythm. See Rhythm.

Sect. VII.—Of the Practice of Melopoeia. See Melopoeia.

Sect. VIII.—Of the Art of composing music. See Melopoeia.

Sect. IX.—Whether the Ancients had counterpoint or music in parts.

This is a subject which has given birth to many learned disquisitions and disputes; and as it long remained a matter of opinion, those who believed, and those who denied the point in question, consequently treated each other with all due polemic ceremony. The champions for antiquity thought themselves involved in the controversy; and whether they were possessed of musical knowledge, or were fit to be admitted to the charms of harmony, or not, they determined to regard every man as an enemy to found literature, who did not subscribe to the articles of their faith.

A poem, called "Le Sicle de Louis le Grand," written by Charles Perrault, of the Academy of Sciences, and brother to Claude Perrault, the famous physician and architect, occasioned the long and acrimonious dispute between him and Boileau, and soon brought on a general war among the learned throughout Europe, concerning the superiority of the ancients or moderns, with respect to arts, sciences, and literature. This piece was first read by the author at the Academy of Sciences in 1688, and was soon followed by his "Parallel des Anciens et des Modernes." The notes to Boileau's translation of Longinus were intended as a reply to Perrault, and are full of bitter invective, not only
only against him, but the moderns in general. Racine, La Bruyère, and Fontenelle, took sides in the quarrel, which in France was kept alive, with great animosity, for near thirty years.

In England, the controversy between Sir William Temple and Mr. Wotton, Mr. Boyle and Dr. Bentley, and Swift's "Battle of the Books," were consequences of this quarrel.

Those who had written ex professo on music, had frequently differed in their opinions concerning counterpoint, having been known by the ancients, previous to the learned, in general, interfering themselves in the dispute, and before we give our own opinion, as an individual, it is incumbent on us, as a historian, to inform our readers, who were the principal champions on both sides. Would it not render our article too long, the reasons aligned by each for seizing his sword, that is, his pen, in the quarrel, should likewise have a place here. But our limits will only allow us to say, that the most eminent defenders of ancient harmony in our femile of the word, are Gaffurio Zarbo, Gio Battista Doni, Isaac Volfius, Zacharia Tevo, the abbe Fragier, and Mr. Sillingfleet, author of "Principles and Power of Harmony."

Their opponents are Gratianus, Salinas, the cavalier Hercules Botrigrifi of Bologna, Artusi, Cerone, Kepler, Mercurius, Marilisus Eneias, Kircher, Claude Perrault, and the late elegant and learned poet Mr. Medon, who had studied modern music, and has left his decided opinion against the ancient Greeks having cultivated counterpoint. (Hist. Mus. vol. i. p. 125.) To these we may add Montempi, the first Italian musical historian, the learned Dr. Wallis, M. Burette, who has explained the subject, and defended it in all its ramifications. Patiri Martini of Bologna, a learned dilettante, has given a specimen (Stori della Mus. i. p. 174.) of much meagre counterpoint as was likely to have been produced without the use of imperfect concords, which the Greeks termed discordes. The late throwed and penetrating critic J. J. Rousseau, is very explicit upon this subject in his "Musical Dictionary," at the article Counterpoint, which he terminates by saying, "It has long been disputed whether the ancients knew counterpoint; but it clearly appears from the remains of their music and writings, especially the rules of practice, in the third book of Aritoxenius, that they never had the least idea of it." After this list of the most respectable writers on both sides of this long disputed question, it now remains to tell the reader ingeniously our own sentiments; and to confess the truth, we will venture to say, that we do not believe the ancients ever did use fomalhymes harmony, that is, music in different parts; for without thirds and sixths it must have been imipid; and with them, the combination of many sounds and melodies moving by different intervals, and in different times, would have occasioned a confusion, which the ancient Greeks had for their language and poetry would not suffer them to tolerate.

Sect. IX.—Of the Dramatic Music of the Ancients. See Dramatic Music.

The Greek dramas confonded of soliloquy, dialogue, and chorus, and it has naturally been supposed, that these were sung to different kinds of music. Soliloquies full of sentiment and passion had probably a different, more elaborate, and refined melody, than the dialogues; but the chorus must necessarily be set to measured music, or the performers, if left ad libitum, could never have kept together.

Sect. X.—Of the effects attributed to the music of the ancients.

Materials for this part of our dissertation are so numerous, that if we were only to present the reader with all the theories that have been related by the most grave and respectable historians and philosophers of Greece and Rome, concerning the moral, medicinal, and supernatural powers of ancient music, this fction would be as full of the miracles of musicians, as the "Golden Legend" is of those operated by the saints. The credulous and exclusive admirers of antiquity have, however, so long read and reverenced all these narrations, that they are imprest by them with an extravagant idea of the excellence of ancient music, which they are very unwill ing to relinquish; and yet, after a most careful investigation of the subject, and a minute analysis of this music, by examining its constituent parts, we have not been able to discover that it was superior to the modern in any other respects than its simplicity, and slight adherence to metrical feet, when applied to poetry. For, as music, considered abstractedly, it appears to have been much inferior to the modern, in the two great and essential parts of the art, melody and harmony.

We have considered the marvellous effects ascribed to ancient music, under three several heads:

First, in softening the manners, promoting civilization, and humanizing men, naturally savage and barbarous: this, by its exciting, or repelling the passions:

And thirdly, its medicinal power, in curing diseases.

And we think, that the whole may be conduced into practical fables, allegories, and vulgar errors. Many fange stories of the power of music over man and beast have gained admission into books, even in this philosophical and unbelieving age, at which perversity will double the fable.

Greek Chrys. See Cross.
Greek Empire. See Empire.
Greek Grammar. See Grammar.
Greek Language, the language of the Greeks. Whether we consider the high antiquity of this tongue, its varied excellencies, the unrivalled models of composition which it contains, or the extensive influence which the study of it has produced on the more modern dialects of Europe, it claims, in an eminent degree, the attention of learned men, as a subject no less curious than useful. The advantages to be derived from the study of these authors who have written in this tongue, are too notorious to need description, and are recommended to us by the united testimony of the learned in every age and country. The Greeks have left the most durable monuments of human wisdom, fortitude, magnificence, and ingenuity, in their improvement of every art and science, and in the small writings upon every subject necessary, profitable, elegant, or entertaining. They have furnished the brightest examples of every virtue and accomplishment, natural or acquired, political, moral, or military; they excelled in mathematics and philosophy; in all the forms of government, in architecture, navigation, commerce, war; as orators, poets, and historians, they stand as yet unrivalled, and are likely to continue unrivalled for ever; nor are they left to be admired for the exercises and amusements they invented and brought to perfection, in the institution of their public games. Nor can we become sensible of these admired excellencies in any of the belles translations from the Greek. They may indeed communicate some knowledge of what the originals contain; they may present us with propitiosities, characters, and events; but allowing them to be more faithful, more accurate than they really are, or can well be, still they are no better than copies in which the spirit and lucre of the originals are in a great degree necissarily lost. The powers of the Greek are vastly beyond those of any other tongue. Whatever the Greek writers describe is always felt; and almost seen; motion and
The Greek tongue, as it was spoken in different provinces, was divided into different dialects, called the Attic, the Ionic, the Doric, and the Aeolic. The Attic is that which was used at Athens, and in the adjacent country; those who have particularly distinguished themselves in this dialect, are Thucydides, Aristophanes, Plato, Herocrates, Xenophon, and Demosthenes. The Ionic differed very little from the ancient Attic; but having afterwards made its way into some towns of Asia Minor, and into the adjacent islands which were colonies of the Athenians and Achaeans, (among which are reckoned Samos, Miletus, Ephesus, Smyrna, and some others,) it imitated a new tincture, and fell very far short of that decency to which the Athenians afterwards attained. The principal writers in this dialect were Hippocrates and Herodotus. The Doric first prevailed among the Lacedaemonians and the inhabitants of Argos. It travelled afterwards into Epirus, Sicily, Rhodes, and Crete. This dialect has been used by Archimedes and Theocritus, (both of Syracuse,) and Pindar. The Aeolic was spoken at first among the Ebaeians and their neighbours, and afterwards it passed into Ionia, a province of Asia Minor, between Ionia and Mytilus, which included ten cities, all Greek colonies. The chief writers in this dialect were Sappho and Alcaeus, of whose writings, little has survived the habit of ancient learning; but this idiom is occasionally blended with the use of the other dialects in the compositions of Homer, Theocritus, Pindar, and others. It may be remarked farther that the lapse of time which occasioned the difference of these dialects, as they arose from a common item, has moreover caused them to differ from themselves. For instance, in the Attic there is a wide distinction between the style of Demosthenes, and that of Thucydides. Nor has the Ionic dialect invariably continued the same, the people of Asia speaking it differently from the old Ioniens of Greece, who followed the ancient language of Athens, and the same observation holds in regard to the Dorians and Eolianis.

The ramification of the Greek tongue into its several dialects, while it forms one leading cause of its copiousness, occasions one of the most serious difficulties in the acquisition of it by learners. This difficulty, however, will be much diminished, if the dialects be reduced to those unavoidable changes, which are founded in the nature of language, and in the progress of speech. The changes we mean are such as flow from the fluctuation of the vowel sounds, from the different manner of combining, or of resolving any two consonant vowels, and lastly, from the substitution or interchange of the homonymous consonants, i.e. the consonants of the same organs.

Oriental grammarians, with much propriety, have divided the consonants into three classes, corresponding with the organs employed in producing them. Thus ร, ฎ, ฏ, being founded by the lips, are hence called bilabials. On the other hand, ง, งг, งгг, งงง, enunciated by a contact of the tongue with the extremities of the upper teeth, are, for a similar reason, labials ง. ง. ง, while ง, งг, งгг, uttered by a contraction of the lips, receive the name of gutturals. This distribution of the consonants, though here confined to the Greek alphabet, necessarily extends to any other system of letters, and well deserves the attention of him who would acquire a philosophical acquaintance with the origin and derivation of words. To the interchange of the homonymous consonants, it is chiefly owing that the proper language of men, at first rude and barbarous, became copious and refined (the same original term hence splitting into many), was afterwards diversified into distinct dialects, and at length into distinct languages. Nor is it, we conceive, beyond the reach of philosophical enquiries to prove that the simple terms of any one language have their kindred terms in all other languages, diversified indeed by the differences of character, termination, and meaning; and that they may be traced back through the several stages of social life, till they meet, like so many shoots, in one common root.

The Greek language is a very copious subject, and a full account of it would carry us beyond the limits necessarily preferred by our plan; we shall therefore content ourselves with some remarks calculated to ascertain its origin, and to unfold those analogies by which it grew from a few fertile roots to the copiousness and refinement which distinguishes it beyond most other tongues.

In enquiring into the origin of the Greek tongue, or in referring to it to a higher dialect, we of course mean its roots or primordial words, which were simple, few in number, and consisting of two, three, or at most four letters; while its compound terms, which are exceedingly numerous and diversified, must have been indigenous, the product of time, and of improvement in knowledge and the arts of life, long after the introduction of its more elementary parts into Greece. With this limitation we have no hesitation in saying, that the simple words of the Greek language are all derived from the Hebrew, Arabic, and Persian, and principally from the first of these tongues. And for the confirmation that the Greek is derived from the Hebrew, or that the Greek primitives are Hebrew radicals, we offer the following observations. Muses, in the tenth chapter of Genesis, the fountain head of universal history and geography, enumerates those heads of separate families by whom the earth was divided after the flood. He describes them by those names which the nations that sprang from them, or the countries they severally occupied, retained in his time. By those parts of the earth, which he calls גֶּנֶּשׁוֹת, or rather by Genesis and Javan, and their sons,—"In their lands every one after his tongue, after their families in their nations." This division must have been regularly conducted. It must have taken place in the time of the patriarchs here mentioned; for the act was theirs, and the nations retained their names to the time of Moses; may many of them long afterwards, for we find them recognized by history and geography. Javan is well known as the parent of the Greeks, the name Ionians being anciently applied to him to the several branches of that nation. But it appears from the sacred history that Javan spake the Hebrew tongue; and he, with the colony under him, must have introduced it with them, and made it the first language of Greece. The letters of the Greek tongue refer its origin to the same oriental source; for they are nearly the same with the Samarian when inverted, or written after the European manner, from left to right; and with little variation they have ever retained the names of the Samaritan or Hebrew alphabet. This is confirmed by Diidorus the Sicilian, lib. v. who gives it as the opinion of persons in his days, that letters were invented by the Syrians, from whom the Phœnicians first learnt their use, and then communicated them to the Greeks. Their Alphabets, Herodetus describes lib. iii. as the inhabitants of Jerusalem, to which he gives the name of Cadpius, the name it had of old, and ill continues to have in the East. The authority of Herodotus and Diodorus, Pliny, u

GREEK LANGUAGE.
GREEK LANGUAGE.
is probable, cliiefly liad in view,

c.

58

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"

wlien he fays. Hill. 1.
Litcras feiiiper arbitror AfTyrias fiiiflc ; fi?d

apud jEgyptios

Mercurio, ut GcUius

a

;

alii

viii.

alii

apud Syros

by the

received

whofe alphabet, confifling of four,
was called the Ionic, in oppofition to the
Attic alphabet, which confilled of merely the fixteen fimple
elements, the Athenians having, with the other llates of
Greece, for a long time rejedled the additional letters,
though after the death of Euripides, in the archonfliip of
Euclid, they were admitted by public authority; and thus
the Greek alphabet, as we now find it, became the common
alphabet of all the Greeks.
Lartly, the Greek language is of Hebrew extraftion,
becaufe its roo-.s will, upon examination, appear to have
been no other than radicals of that language.
In proof of
and-twenty

Ionian',

letters,

utique in Grieciam iiituliflb e PhoEiiice
Cadmum fedecim numcro.''
From the fame authority it appears that the Phoenicians only changed the fliape or form of the Hebrew
letters, and were not the iirll who difcovered them; nor
were they the firll who iiitrodiiced the ufe of letters into
Greece.
For Diodon.'S declares that Linus compofed a
book concerning the exploits of the firll Dionyfuis in Peijjgic charaS.rs, and that the fame were ufed by Orpheus
and Pronapides, the preceptor of Homer, lib. iii. Zenobius writes that Cadmus flew Linus for tcacliing charatlers
differing from his: and Paufanias in his Attics' aifures us,
that he himfelf law an infcription upon the tomb of Corocbus, who lived at the time when Crotopus, a contemporary
with Deucalion, was king of the Argives.
The firll tribe

aLal, to eat,

y.:o>.o:,

who

food, X''"^>

to

rijpertaa

voluwt,

Greece were called Pdafgi, (probablv from
which name correfponds to our appellation
o'i ijl.mders ; and is tlie fame in import with what Mofcs
calls the iirft inhabitants of Europe, the 'iflis of the iiaiions.
Tlie firll European colonills, it appears to us probable,
with the ufe ot the prim.eval language of men, introduced
its letters or charaders, which, by their dlfperfion and confeqnent relapfe into barbarifm, neceilarily became corrupted,
though not entirely loll; while Cadmus introduced the
original alphabet in a more pure or improved Hate.
The
Phoenician and the Pelafgic charadlers, previoufly ufed m
Greece,* were eflentially the fame, and different only in degrees of refinement and it is a remarkable facl, that after
iettled in

fi-Asero;, yj-a,

)

:

the introduftion of the Cadmean alphabet the Pelafgic has
left no trace of its exillence, which in our opinion clearly
proves that thefe tv/o fytlems, in confequence of their affinity, coalelced, and have be<?n perpetuated mider one and
See Lennep. De Analogia, vol. iii. p. 2S.
the fame form.
The introduftion of the Phoenician alphabet preceded the
Chrillian era only about fifteen centuries; and it is curious
to obferve the form and extent of it as taught by Cadmus.

tliis

we

alfertion

give the following

(hort

of them as

lift

fpecimens.
It

I1N'» "^ or an!), ftem, root; hence ccir^, origin, beginning.
means alfo /),v.';;t, youth; hfncc ,^,?r. H^J^S ak', to love

hence

mild. £y

iitw..,

aA.'i',

nes, man, one, U-, iio;, folus. '^^{yS
apiece of bread, x-'''°'> the lip, ;ti>.9',

W,

feed;

a\^«a,-, aXJ'aii',

kitchen.

culina,

ifaXr«,
otXJcsivi-,

aX.Sa, to

^•S\t, alph,
ftudy, invent, in-

veftigate;

'^T::^, eima!, to be languid, feeble, ce;.iaXo,-, tenn!2N'' """> <^'r>:> the fhoulder; ^QJ*, amen, to be
true, hence ct/j-r.^, un-, j^-^r.
This word in Hebrew alfo
means to defend v.ith fidelity; hence apu/oj and ap'jvaOi-, ta
'^^^i

aidu

proteA;

Q'{>,*,

aeem,

wfj-o:,

cruel;

an ifland;

ace,

«f^,

hence air, the earth; T3K» aphen, awheel; hence aTrnn-, a
wain or carriage; "j-l^;, r.rei:, to Rretcb forward, oj?y.,';
'TIN' a chejl, v,p.w, urr.a ; V~\'^, aretoc, in Chaldean r)"1{^,
earth, to cultivate the earth, hence sf)o», f^x*lofj.xi, in Svriac, 37~j{^, aro; hence ajoi, to plow, aj-oujx and (=3,
terra; ~^~l•^;, an; to curfe, hence a^x, ajaof^ai;
\ij'^, fre,
hearth; Hkl'K' ^ facrificc, W^y-^, to feail, EoAi,
Vulcan, is TiCt'SDN' father of fire, or of
facrifice; J^^, baa, S^-y to go;
T\^'2y l'"gfy f*:.'-, to eat;
i"'"'') ~o'fii"', a
flock; Ht;!!' ('">"", a high place,
where an altar was raifed, iSji/jlo; an altar; M^j /'•''^"t to underlland, 7n»i/i' and tivuto-, prudent; "j"!^, iu/W', to pray,
'1

'^,X^-?''>

to eat,

V4<y.i<ro:,

non^'

It ftood thus, K,

to rain, S?-^X'-^' to rain, T?i>x)-, a drop.
Hence alio
the fcnfe of to fupphcate came /Jcsyp^, the bending of
the knee, fupphcation. Hence moreover iSjixzai, a covering

Hence

for the knees, breeches;

it

J ^, "^5 7, ^A «> "^i c", ^, ^, ^,
appiears that the divifion of the Greek or Phccm-

cian alphabet correfponds to that which obtains in all the
Oriental languages the vowels being feparated from the
confonants, and the confonants themfelves claffed conform;

ably to the organs employed

founding them.
It appears
farther, that the alpliabct at this time cxilled in its moll
fimple tlate, and was afterwards enlarged by combining its
repeated gave birth to n,
more fimple elements. Thus
which confiils of one epfiloii turned backwards to face another, as a, and thence a!)breviated into the form of c Alfo
o was doubled, which formed the long v, its figure having
faithfu'ly preferved the double w blended into one letter.
in

;

The

early

Greeks expreifed the

by

afpirate

which the Latins have hence copied

:

and

the figure

this letter

II,

com-

bining with the lalials F-, -, gave birth to : ; \vith the
Moreover,
gutturals y, K, to X ; ^vith the detttah v, t, to ?.
the fibilan"- t coalefcing with tt, ?-, .', produced 4 ; with
Tlie alphawith -, ^, S, produced ^.
X, "/, y., produced J
bet of Cadmus was accordingly augmented by the tollouing
I"'"-' Greeks, wilhing to dilplay
!, J S x> I
letters
C;

r,

-J-

have dignified thele compound
letters (which in reality are only ccMubinations of the liinple
elements,) as the \nvc71lwns of Palamedes in the times of
the Trojan war, or or Simonides of Cos, who tlourilhed
See Bent, on I'halaris,
about 800 years before ChrilL
their

own improvements,

blefs,
in

to

of abode,
litigate;

fornje.I,

v.-.-re

iiill

a refidence; J»"T, dcen,

fjL'.yv.^m,

rsiii,

itiio^i',

isivo-r;

contend, to

to

p'"7, deck, a defence, luxo:,

a.

wall; n.!D"1> ti'^'x^i to fubdue, axiixu:; "]"1P'> ^"d, to venerate, to celebrate, praife, a.iv, xuh; to fing, a-hu-, to re-

verence,

auJlai;,

entertain,

P|in>

|'m,-,

nDPlj

TiXx:,-;

to exprefs;

a

boil,

icju.-,

to be inferior, mjxiu;
''"'''

n'/O'

fi" or
£1^1, to ie; n|, to
y\], zuo, to move, atuu;
ax<\ '"^p, r^u;, a hero, xujio-,

HTI*

^tn^ui;

to illumine,

'^^'"'i

a lord;

Ismb,

''

Ji'^i^, tula, to llain,
xTiXo ; •'», ceil, tivo,-,

'.xK-x^to.,

wine; oiviJi and ouij.,;, a wine-cellar; pj', cue, to afflict,
ana, a.ixi ; ["D^, /«<, to blUTl, jcaii-, xan; pip, kui, power,
y.m:, y.iy.v:, xiw^-, jn"?' ^^S^ to read, to colleJt, >!)i', Xo)o;,
"^n,'.^'

to pollute,

a^utuii,

without a

y.'>yi(:,-,

l^ifjo-:,

m^>

noc, to inhabit,

phcnjh,

to

CT-ifMai,

to

call,

fliine,

water;
a

viii;

'''•°»

;

"^ly, aor, to excite,

;

IHi'

~"'^ to

Sirius, ci;, tlie fun

voji'So.-,

alfo

'(''•''•'<

f'-"^'!

'?^'=-'')

K-''>

10

clalp;

"^"^^^t foa,

to play

inveiligate, contemplate,

ir.aat,;,

crsij.JI,

a

P^~\p,
tumult,

to flow, to
heal; p.n-ru',

t^'-y'y'^t

repair,

trjfiiTc-i',

^~\£,

;

^yr^, lo/, to

multitude,

needle, pxiiov, a
a-'J-^-yit

;

upon, m^;

{^3""> rapha, to

TtJ', Tf/T,

ofi

fliine,

iue, to expect, lian

turba, a

nTl>

i\'\'2, tr.oin, a (lain,
blamelefs, ^/^(.j, to cenfure;

y.iO.-.;, ,..o> Xivi-

ilain,

Cfst^if" ;

<7!i^io,-,

nip,

T-j,3a,

Soo'j,?=i';

f'»;i;,

explain,

K'x>.:y,

tiirbe,

to

Thefe eight letters, bv whfimfoever
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HKJl' g"-' y*'"'' to glory; "Tij;,
tarry, )t^ji, gyre; "njl,'^, nrngiir, a place

move round,

few, to

o-a.i',

to

fave;

on a pipe; ~\'\p, tor,
^si^w; *^jn» tanin, a

vipcT, TDiiM, vy.vo;.

Y

Thefe


GREEK LANGUAGE.

These examples are sufficient to show how the Greek has been derived from Hebrew roots. Some thousands of Greek primitives owe their origin to the same source; and it is not too much to say that, if the Hebrew language had been preserved in its full extent in which it once flourished, not a Greek term could be named, which might not be traced to some one of its roots. But as its records are comparatively so scanty, many of the parent terms of Greek may more immediately be found in the kindred tongues of Syria, Chaldæa, Arabia, and even Persia, which lack, though different in structure from the Greek, contains a multitude of its radical terms. The conclusion that Greek originally flowed from the Hebrew tongue, ferves to explain many of the properties which distinguishes this celebrated language, and to correct many errors into which learned men have fallen in treating this subject.

"The eastern tongues, says Dr. Gillys (History of Greece, vol. i. p. 15.) are in general extremely deficient in vowels. It is, or rather was, much disputed, whether the ancient orientals used any characters to express them. Their language, therefore, must have had an inexplicable thickness of sound, extremely different from the vocal harmony of the Greek, which abounds not only in vowels, but in diphthongs. This circumstance denotes, in the Greeks, organs of perception more acute, elegant, and differing. They felt such faint variations of liquid sounds as escaped the dulness of Asiatic ears, and inverted marks to express them. They distinguished in this manner, not only their articulation, but their quantity, and afterwards their musical intonation. We do not think this observation altogether just, but think it rather founded in a misconception of the oriental languages. In these every consonant included in itself the vowel necessary to its pronunciation; and while they thus prefixed a series of consonants to the eye, each in pronunciation is accompanied with its appropriate vocal sound, which rendered every word just as many syllables as it had of consonants, and gave to the language an exact meaning of vowels and consonants. When the Hebrew tongue ceased to be a living language, its true pronunciation was of course lost; and with it was lost the sound and even the existence of the included vowel; and to supply this loss we invented the vowel points in Hebrew, Arabic, and the accents in Greek, which appear to be of kindred or rather of the same invention with the diacritical marks in the Asiatic tongues. The early Greeks, being unable of the included vowel in the parent tongue, gave it a separate existence, by annexing it to the consonant: and as this vowel, though originally the same and always short, was liable to fluctuation, and to perceptible difference of sound, it naturally gave birth to the several short vowels. In Homer the digamma, which was a labial consonant, interposed between two vowels, which otherwise would have formed a diphthong. And this circumstance might lead us to conclude that the early Greeks conform to the Asiatic tongues in rejecting the nse of diphthongs, and that the use of diphthongs prevailed only as the digamma was laid aside. In the more ancient languages of Asia, all the vowels were short, and every vowel that had no independent form was probably long: but short as well as long vowels came in time to have a separate existence; and the Shinfric, so far from being deficient in vowels, can boast of sixteen, a number more than the double of those in Greek.

We remark, in the second place, that the derivation of the Greek primitives from the oriental tongues will, in general, set aside as npository and erroneous the derivations of the ancient scholiasts, and of those modern lexicographers who have adopted their explanations. These scholiasts and grammarians are valuable as expounders of the Greek text; but as they were apparently ignorant of the oriental tongues, the account which they give of the words thence derived are often frivolous in the extreme. It is necessary to justify this affront by a few examples. Αγαλλια, a hedge or fence, occurs in Theocritus, Idyl, i. 47, and the scholiast derives it from αγαλος, blood; because those who pass through such a fence are made to bleed. This derivation, natory, as it appears, is adopted by Hederic in his lexicon: whereas its origin is the Hebrew סֵּפֶר, a book, to strengthen, to secure, and thence applied to a hedge, which by surrounding defends a place. On the same principle סֵפֶר, a garden, the origin of which neither Hederic nor any of the ancient scholiasts, we believe, have attempted to unfold, is borrowed from סֵפֶר, the garden, from סֵפֶר, to surround: hence the term denoted a place surrounded or secured as a garden is. Lennep indeed derives it from סֵפֶר, a book, a word quite foreign to the purpose. The word סֵפֶר, which occurs in Theocritus, Idyl, vi. 10, is thus explained by the scholiast: סֵפֶר, a book, a fountain in Cos, from the particle סָלַח, to flow, or because it resembles the nomina of סָלַח; whereas סָלַח is evidently the Hebrew סֵפֶר, a book, or סֵפֶר, a fountain. The Greek scholiast, annexed to every author, abound with such peculiarities as the above; nor is the "Etymologicum Magnum" to be excepted, though the Greek lexicographers have fought for no better or more rational guides in their enquiries after the origin of the words which they explain.

Hemsterhuis, Vulckenaer, Rubniken, Villoisson, Lennep, Scheid, are indeed justly celebrated among modern critics for their researches into the origin and meaning of the Greek tongue. Their theories contain many valuable observations on the analogy by which that language grew from comparatively few radicals to its present complicated form; but their jumble of etymologies appear to us, for the most part, fanciful and erroneous; because in no instance, or at least in very few instances, have they fought the Greek terms in the languages of the East, whence assuredly they had been derived. Hemsterhuis derives שֵׁס, Deus, from the verb שָׁש, to run, to dispise; while its real origin, in our opinion, is the Hebrew and Arabic שֵׁש, שֵׁש, pronounced in the latter language שֵׁש, to shine. The Chaldeans represented the Supreme God under the figure of light; and to this representation the facred writer seems to allude, when he says that God is light. The same writer deduces יִשְׂמָה, יִשָּׁמֹה, from יִשְּמִה; while its source is יִשָּׁמַה, שָׁמַר, to be strong. From the same origin the hepplie uses יִשָּׁמ, יִשֶּׁמ, יִשָּׁמ, שָׁמ, before, to have flowed, though it seems to point to the Hebrew שָׁמ, שָׁמ, which in Arabic means the head or root of a family, and hence it came to signify origin or priority in the form of יִשָּׁמ, hence prior or prates in Latin.

Scheid derives יִשָּׁמ, שָׁמ, שָׁמ, שָׁמ, д, д, a bird, diversion, which was taken from birds. The same writer will have יִשָּׁמ, יִשָּׁמ, יִשָּׁמ, יִשָּׁמ, יִשָּׁמ, to stretch, though far more naturally it points to the Persian س, س, س, س, a tooth: in, hence שָׁמ, שָׁמ, שָׁמ, Shema, primarily meant, to cut with the teeth. The Hebrew שָׁמ, שָׁמ, שָׁמ, שָׁמ, שָׁמ, שָׁמ, שָׁמ, to shine, to scourch, gave birth to שָׁמ, שָׁמ, שָׁמ, שָׁמ, שָׁמ, שָׁמ, but Villoisson foolishly derives it from שָׁמ, שָׁמ, radere. The same critic as wisely traces שָׁמ to the same root, because, says he, лимм, is ad radicum aptum. But its origin is evidently שָׁמ, שָׁמ, a grove, hence שָׁמ, wood, and by dropping the initial vowel שָׁמ, and by transposition שָׁמ, שָׁמ, שָׁמ, שָׁמ, שָׁמ.
Greek Language.

The passage of this folio is further a version: There exist apart in the plain, in the front of the city, namely Troy. This term is called Batheia; but the Immortals the tomb of for-laying Myriame.

The language of the Trojans, though a dialect of the Greek, was, we may suppose, from their situation, mixed with an influx of Italic terms. Of this class is Batheia, which in Hebrew is Ytt, and means an abode. In Isaiah, xiv. 18, and Joel, iii. 25, it signifies the last home of man. The term here occurs in the Greek form 

But is the rational of", which may for contrary, accessible by a circular arc.

This paragraph is a fair specimen of the manner in which these etymologists have, by certain analogies, founded on their own fancies rather than on the real structure of the Greek tongue, yoked together under one common root words the most foreign to each other. The verb 

Greek factum ex opes, but from 

the same origin are derived opes, opes, opes, opes, opes, opes, opes, opes, and opes, all of which are but different modifications of the same primitive words by different people who used the same tongue. On the other hand, opes, to come or go, originated in 

or 

to travel, prolong, extend. On the other hand, 

which means a row of plants, or the order in which anything is done, is from the Hebrew 

arranged, arrangement, measure, rhythm, came the verb 

or 

to the sounds of music in a dance or to the battle. The movements in a dance and in war have been regulated by the same measures; and hence dancers and warriors had the same names applied to them. 

Macbeth being called 

as the author of the Etymological writer, 

Hence, too, a leader, i.e., one who put the men in order of battle, was called 

and, moreover, 

which denoted a species of dance, came in Latin to signify præsum. Such learning, acuteness, and diligence as were possessed by Herder, and the celebrated men abovementioned of his school, however perversé, could not altogether have been misapplied. Their labours, therefore, must preface some imbecility of just etymology, but their fury, upon the whole, appears to us both fanciful and erroneous, and calculated more to perplex their readers than to furnish them with solid information.

Etymology, as it may serve to ascertain the primary sense of a word, to unfold a general principle in the formation of language, to exemplify the manner in which philosophical notions, political occurrences, and religious institutions influence the mind and give birth to new modes of speech, is a subject of rational and useful inquiry. In this enlightened view it blends itself with the history of philosophy, of politics, and of religion, with the structure of the human frame, and even with the theory of the human mind. Connected with any or with all of these purporses, none but the unimformed will neglect or decry this branch of philology as vain and useless; and without such connection none but pedants will pursue or extol it as worthy of attention. As the Greek originated in the Etruscan languages, a knowledge of these languages to a certain extent is absolutely necessary, to form a rational and competent etymology in the dialects of Greece: and many passages must exist in the Greek writers, especially the more ancient poets, which can be understood only by light reflected from the East. It will not be foreign to our purpose to illustrate this position by a few examples. The first we select occurs in Homer's Iliad, i. 815:

Or 

The next passage in which the use of the Oriental tongues serves to illustrate obscurities in Greek authors, we shall select from the Agamemnon of Aeschylus. On this paragraph much has been written, and written in vain by the critics. Clytemnestra, the lady Macbeth of ancient days, boasts of her fidelity, during the absence of her lord, and the joy with which she would receive him on his return.

Oeci ida xégal, exh xégal xegal.

Allei prox anlws kalado x xégal xégal.
Greek Language.

The lines are thus rendered in the elegant and poetical version of Mr. Potter:

Never knew I pleasure
In the blamed converse of another man,
More than the virgin metal in the mines
Knows an adulterate and debasing mixture.

On this passage the author has the following note: "I have honestly says, "all quid sed quid non intelligo." Mr. Heath disapproves the allusion, though he thinks it a proper expression, the grace of which is lost on our ignorance, and says, "quid non sed quid non videmus alies olim formian videmat."—In the old Persian called the Prid, the first principle of things was called 2N, and though supposed to be fire by the disciples of Zaroulia, the term is a modification of 2N, ad, water, which the Arabsians maintained to be the original element. With the notion that water is the primary matter, the early Greek philosophers appear to have borrowed the term. Hence Euan, to plunge, (which Leunpe ably deduces from 2N) hence to Euan, immerse; and the pirane 2N xi 5N is a metaphor for a flat or wound, it being produced by a weapon plunged into the body as into water. The sentiment which the words convey to the herald, whom Clytemnestra addressed, is to this effect, "I know no pleasure with any man, and feel no more the sting of calumnies, than the point of a spear. But the language is studiously equivocal, and in this peculiarity confined at once the skill and the obscurity of it. While the queen appeared to express the above meaning, the in reality expressed quite the reverse. I know no greater pleasure, though no report more disgraceful, than a spear plunged in him, (namely Agamemnon,) by another husband. This artful equivocation arises from the manner in which the clause ανα σητον αυτης απισταν is connected. If taken with παρα, the lines convey the spear; but with 2N xi 2N, they convey the light.

For this interpretation we have the best authority, namely that of the Chorus, who were present: who, perceiving that the herald was misled by the artful ambiguity of the words, hints at their true significancy as soon as the queen withdrew from the stage.

Autē me 1ooy xei μακάρισαν σατ 
Ταραξιζα ερεμον επικεφαλεια λογα.

Which may be thus rendered: "This woman hath told thee learning (the who hast yet to learn,) what see is, a tale which discerning interpreters perceive to be very learning,—well to become her character and views. Here 2N depend on πεποθας; and the Chorus intimate, that her words, understood, as they seem to have been by the herald, were false and unbecoming, but strictly true and appropriate in the sense in which they, who knew the woman better, had reason to regard them. Taken in the light sense, the metaphor 2N xi 2N is too violent for the simplicity of the foment; and the falsehood, moreover, is so glaring as to clash the queen with the bafed of deceivers, without a trait of that masculine intrepidity and elevated ardour with which she preferred to the object of her desire. In the latter it exactly suits the dark ambiguity of prophecic language: and the boldness of it is in unison with that vehemence and glow of pleasure, with which the anticipated the plunging of the weapon in the bosom of her husband. For these reasons the Chorus justly pronounce her language πεποθας, as at once expressive of her true feelings, her artifice, and her intrepidity.

Lycophron, who flourished under Ptolemy Philadephilus, is known to have studiously affected the use of hard and obscure terms, which, from their antiquity, must demand the attention of Asiatic scholars. In his Cofandria, the only remains of his voluminous productions, occur these lines:

They contain a prophetic address to Paris, now commencing his expedition for the rape of Helen, and may be literally rendered: —The ship and seat of Phereclus will bear thee to the two ports and coasts of Gythium, having in their fists to the rocks the crooked teeth of the pine, Hecules (i.e. singularity,) of the flood. Phereclus as an artist constructed the ship, and as a footsayer, confounded the gods, and endeavored to conciliate them to the projected expedition. As such, he was naturally led to give the vessel the name of τηρεμνος, which with the Greek termination is the Chaldian and Pharian term for the tutelary gods, Διηνυμος, ταρπαμ, or τραπαμ. The scholar says, it is the name of a foreign ship; and in this he is followed by Hefychis. It was certainly usual to carve the images of the gods on the ship, which they were suppofed to protect; and to them the sailors fled in scenes of danger. (See Hor. i. 14.) The figures, which at this day are often framed in the forpart of the ship, are but the remains of the same custom. The practice, no doubt, originated with the Pharian: and it was natural for them to call their ship by the name of these gods which were suppofed to preserve them. The rudders, the oars, the sails, by which the vessel was moved, are here affectingly called the τιρεμνος, he being the author of them. Of the derivation of the term the scholiast and Hefychis appear equally ignorant, and the whole of this passage is a striking instance how incompetent the ancient commentators were to explain in many places the terms of the Greek tongue.

The ancients had statues of their gods seated before their doors, and in the entrance of their harbours. These received the salutations of strangers and passengers. Lucian mentions this custom in his first book. Hence the doors and ports received the name of τηρεμνος, as being places where the gods were treated, from the Arabic Διινυμος, salutations. The account which the scholiast gives of this term is ridiculous: τηρεμνος περι το σον ελογιαν, τεριο δυν σολομ. The explanation of Hefychis is more rational, though not the true one: τηρεμνος, οι θεοι περι το σον θειον. This is a fair specimen of the manner in which the Greek words, derived from the East, are explained in the old glossaries. But farther, πεποθας, ταρπαμ, is the Hebrew אושד, falkh, or πλαγ, (the vowels being arbitrary, and not existing but as included in the consonants of the original,) and signifies to divide, and whence a noun any thing divided, such as portions of the land and sea. From the same original is derived πλαγιας, as serving to divide the earth into distinct territories: hence too, the Latin plagas, a chine or region. Finally, the unfruitful term πεποθας originated in the Persian πλονιας, an extremity or limit which, as the limits of a river came hence to signify its lands; as the limits of the sea its shores, or the rocks lining them. The limits of a door are its polis; and hence the Celtic word lyuncori, the door polls; and probably from the same source, on account of their remoteness, and probably has been derived the appellation alligned to the Canary Islands.

The attempts of Paris, under the auspices of Phereclus, to appease or conciliate the gods, are alluded to by Horace, lib. i. 15, who appears to have had the passage of Lycothron in his view. Phereclus, the first adviser, perhaps,
Greek Language.

of the expedition, is represented by Homer as properly punished; for he received an ignominious death from the hand of Merion. The poet adds, I. v. 65, ἐφησον ἱματικ, 

since he did not at all know the decrees of the gods. To say that Pherorchus did not possess this knowledge, appears not only a profane, but an unnecessary saying: for who is the man that is acquainted with the divine decrees, while yet unfallen? But when it is considered that Pherorchus had pretended to be so knowing, and probably predicted future success, while the event turned out very different from his predictions, there is much propriety and even point in the remark; since it holds forth the diver as a deceiver, who by his impurities brought ruin upon himself and his country. From this we may conclude, that the beauties of Homer, who confines himself beyond any other poet to general nature, yet in many instances depend upon circumstances unknown to, or unobserved by modern readers.

The prevailing taste for oriental literature promises to contribute much to the improvement of philology. And when clavish scholars shall engage with due attention in this pursuit, the more ancient Greek writings will share in the general benefit, by the light reflected upon them from the East. The derivation of the Greek from the oriental tongues, the frequent use of terms which Homer, Hesiod, Lycophron, and others have adopted in their primary significations, have occasioned difficulties which a critic, however able, but verified only in Greek and Roman authors, is hardly able to solve. These difficulties, instead of being explained, have been glossed over by the futile etymologies of the ancient scholiasts and lexicographers: and they can be properly felt and successfully removed only by those who have extended their study from the elegant language of the Greeks, to the no less polished languages of Persia, Arabia, and Judea. Of this position the examples above cited afford sufficient illustration: and they are, it is hoped, too curious, new, and solid, not to be undermining of a place in a dictionary of science.

In the last place, the derivation of the Greek from the ancient languages of the East, will account for the origin of the much disputed digamma. In these tongues gutturals abounded, which, like other consonants, contained in themselves the vowel necessary to their pronunciation. But it is the tendency of every guttural, when become habitual, to fall down, in the rapidity of utterance, into a mere aspirate, till it at length vanishes. Thus corvis has degenerated into hora; χωρ, into huna, earth, and into hona, a creature of earth, man. Thus also the Hebrew ה, which signifies life, soul, self, appeared in Greek in the form of γ, αγα. Moreover דד, kalad, a liver, gave birth to (πατωνι). This word retains an unquestionable mark of its derivation, for it has the form דד, kedos, or דד, kador; and this variation has been transferred into the Greek καδος and καδος. Hence we obtain the origin of the aspirate placed over a vowel. It was originally a guttural, which losing its power as a consonant left the included vowel behind, with an inverted comma above, to perpetuate that part of the letter which fell into diffus.

The guttural, when softened into an aspirate, is apt to be dilated into a long vowel. Hence the reason why γ, in the ancient Greek, seems to have been accompanied by an aspirate, as in ὑδέγειν. On the same principle that a guttural softens into an aspirate, the aspirate often melts into a gentle breathing, or becomes in pronunciation quite quick, as the Latin honora and honos become in English honour and honest, the b being mute. On the same principle the gh became silent in our tongue, as in taught, fought. So in the Greek ἡβης, (αυτος, a king, has degenerated into ωνος, which Homer pronounced ωνος. This leads us to remark, that the aspirate, instead of vanishing, was changed into a labial letter ων, ων, b, f, or c. Thus laugh, cough, which are still strong guttural sounds among our northern neighbours, are found left, c, among us. Thus also in Greek, what was at first written χαρπος, was pronounced χαρπος; and the words ωνος, ωνος, were found ωνος, ωνος, or fou, fou, fe.

But the digamma did not always originate in a guttural, but sometimes in consonants allied to our w or y. Thus from γ, 'y, is derived the Greek ἰδα, which in Homer is found with, because the original is yada, hence the Latin videt. So again from λιθος, y is taken, λιθος, founded winae: hence nations, and nation.

We have already observed, that in Hebrew every consonant contained in itself the vowel necessary to its pronunciation. This vowel the Greeks detached and gave it a separate existence, by subjoining it to the concomitant consonant. And as the Hebrews seem at first to have founded every consonant, thus dividing each word into as many syllables as it had of consonants; and as they further seem to have used vowels only in conjunction with consonants, and to have considered them as unfit to be employed alone and independent, so the Greeks, in imitation of them, used at first only short vowels; they next adopted the long or compound vowels a and e; but still avoided the diphthongs, and when any two vowels concurred, they converted the first of them into a labial consonant. Thus, διαφορετικος, was founded not lampetovoti, but lampetovoni, or lampetovit; and μουσας, pronounced μουσας, or μους; αυς, αυς.

This letter is called digamma, because it has the form of two gamma, one upon another like our capital F, and also called laphis, as supposed to belong exclusively to theIonic dialect. But this account of it proves, that it did not belong, as Dr. Bentley and others have supposed, to the Ionic dialect only, but to all the dialects of Greece, in their more ancient mode of pronunciation. It follows also that the universal opinion of the learned, who say that the digamma at first prevailed, and was afterwards succeeded by the aspirate, is the reverse of the truth. For the true state of the case is, that gutturals at first prevailed; these softened into mere aspirates; and these again were changed for a more easy and agreeable letter, which being simply a labial was diversified by different people into y, ι, ι, ι, ι, b, f or c. But the digamma, it will be laid, is to be found only in Homer, by far the most ancient writer of Greece, while the aspirate is in all the more recent authors. The answer is this: the use of the aspirate obtained in the written language, and was, therefore, less susceptible of corruption. On the other hand, that of the digamma prevailed in pronunciation, which was more liable to change, and to deviate from the original terms. Homer, we may naturally suppose, adopted the first in composing and writing his poems, and the last in reciting them to the people. The written form, we may presume, was at first used but little, but prevailed by degrees; while the peculiarities of pronunciation in their turn began to decline. The language, as written by Homer, at length became fashionable in the conversation of polished people, and the aspirate, being thus triumphant in the daily converse of learned men, would, of course, in their writings, triumph over oral and temporal corruptions.

The change of a guttural into an aspirate, or into a long vowel, or into a labial letter called the digamma, is not peculiar to any one language, but is founded on the structure of the organs of speech; and instances of it prevail in all languages, both ancient and modern.

The preservation of the aspirate in the written language of Homer,
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Homer, while the *digamma* was used in reciting them, is a proof (if a proof be wanting) that Homer did actually use a *caferian* language, and that his works were preferred by a written language; otherwise the *digamma* would have been left, and the *digamma* alone would have prevailed in all the Greek authors who succeeded that celebrated bard. If an editor of Homer in modern days would invert the *digamma*, he would corrupt the original orthography of Homer, and subliterate in the room of the original characters the corruptions of pronunciation.

We shall now make some observations on the leading parts of speech, which must serve to unfold the peculiar nature and amusing character of this language. As *gender* is the distinction of sex, there cannot in *trinernma* be in any language more than *two* genders, masculine and feminine; nouns expressing inanimate objects, or things without life, being in a philosophical *fem. siter* or *either* gender. But *neuter* nouns had by analogy assigned them the terminations of masculine and feminine nouns; and unfortunately for Greek, and the other European languages affected by it, the termination became fixed regarded as an index of the gender, without any reference to the meaning. Thus nouns designating females ended in -α or -έ; and for this reason the names of inanimate things, and also adjectives, having the same ending, are said to be *feminine*. For the same reason nouns in -ον or -ένον, though meaning things without life, are generally masculine, because these happened to be the predominant terminations of the names of males. There are, therefore, in this language two principles which regulate the gender of nouns, the *fugification* and the *termination*; the former ascertaining the gender of living things, or things whose sex it is of importance to distinguish, the latter that of inanimate objects. There is, however, a third principle, on which is founded the distinction of gender, we mean the analogy which inanimate objects sometimes have to living creatures. There are several terminations common to males and females, and these afford such analogy an opportunity to operate. Thus *άρξις* reason, though expressive of what is neither male nor female, is made masculine, as signifying the commanding and the most excellent faculty of the human mind; whereas *κάτα*, *άρχιτευκτικύ*, from its affinity to *κάτα*, the earth, or from the passive nature of its *fugification*, a characteristic more of the female than of the male, is made feminine. That this analogy is not fanciful might be proved by many instances. In Greek, *εικόνα* is masculine; but *Theocritus* (Idyl. i. 132.) in representing it as producing *violet*, makes it feminine. This affinity to the female sex is the reason why *άρσις*, with the specific names of trees in *άρσις*, is always feminine, though the termination is decidedly masculine. In cases where the termination absolutely belongs to the names of males or females, this principle of *analogy* necessarily gives way to the termination. Thus, because a *final* is invariably appropriate to feminine nouns, *άρσις, áρσις*, *ής* is feminine; on the other hand, *ένος*, *άρσις*, is masculine, from its termination as well as from analogy.

Nouns and verbs in Greek have a *dual number* to express two things, or such things as are in pairs, as hands, eyes, feet. The *fug* of the dual occurs frequently in the poets, though not peculiar to them, nor always observed by them, when speaking of two objects. The dual number is by no means necessary in language, although it may enable the Greek to express the number two or pairs with more elegance and precision. It was, therefore, rejected by the *Eolians* and by the Latin, who derived their tongue from the *Eolic* dialect. The seventy translators, moreover, have rejected the *fug* of the dual number, and in this they have been followed by the writers of the New Testament and the Greek fathers.

*Cases* have been defined by all modern grammarians to be changes in the termination of nouns; but the name *παράγον*, in Greek expressive of *cases*, clearly shows that this is not the primary meaning of a *case*. For *παράγον* means a *fall*, and, from signifying a *fall*, it came to signify the place in which a noun falls in a sentence. The ideas, then, which a *case* at first expressed is the *position* of a noun in a sentence, and by that position expressing the relation of one word to another. Thus, if a noun denoted the *direct* subject of a proposition or discourse, it is said to be in the *right* *case*, *πάραγον*, *πάραγον*, i.e. the *direct* or *straight* position; but if a noun expresses an object or quality *indirectly*, it is said to be in an *oblique* *position*, *πάραγον*, *πάραγον*, and this deviation from a *direct* to an *indirect* position, as the subject of discourse, is in the language of grammarians further called *cases*, *declension*. Further, *cases* express the relation of things in motion or action, and the relations necessary for the purposes of language are chiefly the following: the relation of *causa*, the relation of *effect*, the relation of *beginning*, the relation of *medium* or *instrument*, and the relation of end. A noun denoting the relation of *causa*, i.e. denoting the agent of an active or the subject of a neuter or connecting verb, is in the *nominaive*; that of effect in the *accusative*; that of beginning in the *genitive*; that of medium in the *instrumental*; and that of end in the *dative*. The *nominaive* above is called the *right* or direct *case*, the rest are all called *oblique* *cases*; though the *accusative*, as expressing a direct part of a proposition, might more properly be called a right, than an *oblique* *case*.

Moreover, the *relations of bodies in motion or action* were at first expressed by *prepositions*; and our ideas of relation arise from the things related, and which succeeded them in their formation, *prepositions* being, and probably, did, in the early life of language come after, instead of going before the nouns which they governed. In consequence of this arrangement, they combined into one word with the final syllables of the connected noun, and thus served to give a diversity of terminations. Hence the origin of *cases* in the *fug* in which cases have hitherto been described by modern grammarians. It is worthy of remark, before we quit this *subject*, that the *nominaive*, as expressing *causa*, has a close affinity to the *genitive*, which means *beginning*. But the former fixes the attention on the noun, as an *agent* or a *cause* in action: while the latter holds forth its noun as the *source* or *beginning* of motion. The *beginning* of a thing is often the author and owner of that thing: hence the *genitive* has the *secondary* *fug* of *possession*. On the other hand, the *accusative* is nearly allied in *fug* to the *dative*; but the former is not used in its strict and original *fugification*, unless it denotes an *effect*, or the thing in which *motion* terminates; while the latter, in strict propriety, marks the end to which *motion* points, and in which it terminates. The *genitive* *blends* opposed to the *dative*, as beginning to the end, like the opposite points of a right line; while the ablative expresses the *medium* or *instrumentality* of the *motion* by which that line is generated. The *ablative* therefore denotes one of the most important and distinct relations in language, and yet the Greek, with all its boasted copiousness and *preposition*, has not a distinct termination to express this *case*, but denotes it sometimes by the *genitive*, and at others by the *dative*, with or without a *preposition*. Finally inanimate things only move after they are put in motion, or act as they are acted upon. This is probably the reason why neuter nouns in Greek have no termination to express *causa*, distinct from that
GREEK LANGUAGE.
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a radical noun
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tion is the origin of that clafs of nouns called yi<7/ran )v«/Vj
llsXiy;, Wih-M-r,:, one having the form of Peleus, i.e. the fon

7tnfj.i

of Peleus.

logy of verbs

adjectives are derived

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There

Greek but two perfonal pronouns, that
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Its origin
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Pronouns of the third perfon are omy definitives or reflriCtive
adjectives agreeing with the noun defined, exprefTed, or implied. The chief of tlicfe is ;,//jf,/'f, which very improperly

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-.A^'fj^i,

This complex fp$.
cies of verbs is hence reduced into great iimpiicicy,
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Grammar,

numeral adjectives, alfuming the character
of nouns by affociation with the verb. Theie are tw, /;T-jor
Tu, thou ; and they are evidently derived from the IKlirew
written in the various forms
'D.!X> anhee, I, which in Greekis
of 0'"> =/"'' "/^"''''^'^^' '">'>'' ! nrit^» '''"> and by droppi-ng
on always exprefks the fubjeift
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Latins have derived

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—

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is j~, //•(?, or ta, a fragment
lonians formed this peru^i in

iicrfe,
thou liwwefi ; r.criy, thou ivif}.
llie abc
.)ove irairment, conliiting of th or
only, has been corrupted into j,
Hence the fecond jierfon in every tenfe of the active voice
terminates in .r, with tot k fliort preceding.
Tlie iubjnnelives 1, u, form no part of the original inoiKMins, but were
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often the cafe, to lengtiien the piecediuT vowel,

in Hebrew is
W\^, hue, which is the
parent of he in Englilh, and in Greek of :.
This, with the
fubjunctive i, forms the third perfon, TLs-r:<.
To the origin
nalS the lor.ians added r>.
Thus in verbs in /.., Tj^..cri,

Ti.'j

third

pronoun


GREEK LANGUAGE.

The second aorist is the same tense with the imperfect, and verbs of the imperfect differ from verbs of the second aorist, not because they express different modifications of past time, but because they come from different roots. Thus, from πηνον and τηνον are derived the imperfect πηνον and τηνον, while τηνον and τηνον, in the second aorist, have been deduced from the oblique πηνον and τηνον; as is the modification, so are the terminations the same in both. The puperfect has its personal terminations from the imperfect, by annexing the subjunctive in each person—σαν, σαν, &c. The characteristic of the first future is that it is not the first aorist, as is supposed by grammarians, but the first future, which is, indeed, proved by its signification, as well as by analogy: for, in all instances this tense expresses a future time, not absolutely so, but time future in regard to another verb connected with it in the sentence. The optative has its tenses, in general, derived from the corresponding tenses in the indicative, by changing into ιον: but the first person, as it has been observed, is derived from verbs in μον; as, if οένονον, οένονον, οένονον. The third plural, like the third singular, follows the analogy of verbs in μον, iron, contracted in the same manner as οένον becomes οένον.

The imperfect mood, originally in the first person, retained ον of the imperfect tense; as λέγον, let me receive. Hence, dropping the final ον, it has, in the common tongue, the first person in έτον. The pronoun γινε, which, in Persian, is to added in the form of τον, constitutes the second or third person—γινε. And γινε, contracted into γινε, forms the third plural—γινε, which, by dropping γινε, is again abridged into γινε, erroneously supposed to be the dual number. When a command is given, it is necessarily given in the present time, and it can be executed, not in the γινε, but in the future. It is impossible, therefore, in reason, that the imperative mood can have a γινε tense. Thus, γινε is the present imperative, or that of the second future; and γινε is the first future, not the first aorist. In some of the dialects, 2ον is substituted for the subjunctive vowel. On the other hand, the Lornians change γινε, or without its concomitant vowel, into 2ον. Thus, in the imperfect, for 2ον, or γινε, they used 2ον, I 2ον: for the present γινε, γινε, which the Attics contracted into γινε; and in the third person plural, of the passive form, for γινε, they write γινε, and for γινε, γινε. In the same manner γινε, which is used to be the first aorist, but which, in reality, is the first future, becomes, when γινε is added, not γινε, but 2ον. From the imperative thus principally ending in γινε, we obtain the third person plural in γινε—γινε, γινε, which are contractions of γινε, γινε, or γινε, and γινε for γινε. By the above Ionic analogy, we also obtain what is called the άοοις first aorist, γινε, which has the personal terminations of the first aorist indicative. It is thus changed from τον to 2ον, used for 2ον, in the same manner as δον is for δον.

The infinitive is formed by adopting γινε, or, as it is in Hebrew, γινε, into 2ον, and by subjoining 2ον, 2ον. In the perfect it has γινε, 2ον; but in the first aorist it is dropped—2ον, probably for τον, which, after the analogy of the perfect, would be γινε. In the Ionic and Attic dialects, the infinitive, however, is formed from verbs in μον, though oblique, τηνον, τηνον: as 2ον, or 2ον, which or 2ον, 2ον; or 2ον, 2ον. To these, after the analogy of the perfect, is added 2ον, 2ον, 2ον, 2ον, 2ον, 2ον, 2ον, 2ον.

The passive voice is formed by combining the subject of the passive with the personal pronoun in the dative case—μον, μον, or μον. Thus 2ον, μον, house for me; μον, μον, house for thee; μον, house for him. These combinations, which by a slight change become μον, μον, μον, μον, μον, μον, came to convey the idea, I have a house, thou hast a house, or I am housed, thou art housed. And this is the reason why the passive form in all authors have either an active or a passive signification, the context alone serving to ascertain the tense of the verb. The dual γινε is made passive by changing into 2ον, 2ον, and not τον, and it is worthy of remark, that in the first person plural it takes 2ον before it very frequently, as τον, for τον, and in the imperative 2ον for 2ον.

As the personal pronoun, combined with the radical word
word to form the passive voice, was μις, the primary form of the verb must have been τιτωτήξ, and not τιπτωτήξ; and in the imperfect τιπτωτήξ, and not τιπτωτήξ; and afterwards ἐπετίστη into ἐπετίστη, as in other numerous influences. Hence the passive form of verbs in -ία was originally the same with that of verbs in -ία; and this form had only two femes, μις for the present, and ὑπό for the past. The second person singular is formed in the common tongue by dropping ε and contracting the two succeeding vowels in every mood and tense. Thus τιπτω, τιπτω, τιπτω; imperfect τιπτω, τιπτω, τιπτω, -ότι, -ότι, -ότι, -ότι; first aorist middle τιπτω, τιπτω, τιπτω; optative τιπτω, τιπτω, τιπτω; -ότι, -ότι, -ότι, -ότι. The first future middle is derived from the first future active, by changing ε into ὑπο. The second future middle is derived from τιπτω, (which is from the obsolete τιπτω). This drops ε and is contracted—τιπτω, τιπτω, τιπτω. Hence what is called the second future is no other than the first future. The same obsoleto radical has given rise to the second future passive, which is no other than the first future—τιπτω, τιπτω, τιπτω. It preserves the future from the obsolete in τιπτω, τιπτω, τιπτω; while the first future is from the obsolete in τιπτω, τιπτω, τιπτω. What grammarians call the first aorist passive is from verbs in -ία as τιπτω, τιπτω, τιπτω; ἐπετίστη, ἐπετίστη, ἐπετίστη; ἐπετίστη, ἐπετίστη, ἐπετίστη. The third plural s is dropped—τιπτω, τιπτω, τιπτω. So in the active voice, τιπτω for τιπτω; τιπτω for τιπτω; τιπτω for τιπτω. In the infancy of language, while words were yet feeble, the mind, naturally war, whereby a writer or speaker might give an additional weight to his meaning, was to repeat such terms as he wished to render emphatic. The more ancient any language is, the more numerous appear the traces of such repetition; and, next to the Hebrew, they form a remarkable feature in the Greek tongue. Thus, μις, μις, I defile defile, blended into one word, became μις, and means I greatly defile; ἐπετίστη, ἐπετίστη, I walk walk; ἐπετίστη, I stride; and such words are numerous in this tongue; from which we may draw the following influences.

First, that the augment is only the remains of a verb δεσιλλιδ, in order to augment the viene. Secondly, this augment takes place in the present tense as well as in the imperfect as τιπτω, τιπτω; κλησι, κλησι; ἐπετίστη, τιπτω. Thirdly, that the augment of the imperfect, and of the aorist, is but a corruption, still more remote of the reduplication; and that the dialect, which presumes a consonant to the vowel like the perfect, such as τετοιανα, for στεπτερια, is the most ancient usage, and comes nearest to the primitive simplicity of the language. Fourthly, the augment is applied to the first and second futures; and the effect of it is to increase the figurative of the verb; τιπτω, τιπτω; ἐπετίστη, ἐπετίστη, τιπτω. I will cry loudly; τιπτω, τιπτω, ἐπετίστη, τιπτω, I will greatly rejoice. Fifthly, that the form called by grammarians πάλαξ γείταντα is not a distinct tense, but the first future middle augmented; τιπτω, τιπτω, τιπτω; τιπτω, τιπτω, τιπτω. Sixthly, that the augment of the perfect was more nearly to the original reduplication than that of any other tense, which is preserved still more distinctly in the augment of verbs beginning with vowels α, ω, ε, and the like.

The Ionians, who have observed, changed into τιπτω; and this analogy, perhaps, converted the imperfect form τιπτω, into τιπτω, of τιπτω. The third person plural would be then τιπτω, τιπτω, τιπτω. Hence the Boeotians used τιπτω, τιπτω, τιπτω. The Dorrians write τιπτω, which, in the common tongue, is softened into τιπτω. The simple and natural way of forming the perfect was to give it the characteristic of the present which it always implies, as an action, though past, still continuing in its effect; τιπτω, τιπτω, τιπτω. But from the facility by which letters of the same organs are changed for one another, τιπτω became τιπτω, and τιπτω, became τιπτω, τιπτω, τιπτω. Hence τιπτω and τιπτω, which are improperly called the perfect middle, seem to be the original perfect active, accidentally corrupted. And as there is no intention for the distinction of perfect active and perfect middle, the fact there is none in figurations. When, from whatever cause, a in longe verbs became the characteristic of the perfect, it prevailed in other verbs, which still retained the characteristic of the perfect—τιπτω, τιπτω, τιπτω. The distinction, therefore, of perfect active and perfect middle: a fiction of grammarians, founded on the interchange of similar conforims, or the blind impulse of analogy.

Propositions form the most difficult part of the Greek tongue, not only because they, for the most part, govern different cases, but because each has a great variety of significations. Yet the author of the Greek grammar, above mentioned, has laid down two observations, which tend greatly to simplify this branch of the Greek language. The primary meaning of a proposition, says he, is to be found in the root from whence it is derived, and the meaning is obtained, or one obviously connected with it, and flowing from it by analogy, it prefers in all cases whatever. A proposition combines with its own signifies the meaning of the case in which the dependent noun is used, and governs the genitive, the dative, or the accusative, as the writer wishes to fix the attention of his readers on the origin, the intramoreality, or the object of the govern noun.

We cannot forbear transcribing one infallence (which is the first that occurs) of his manner of explaining the propositions—υπο (from the Hebrew נ, ah, a stem or root; and as the root is underneath, the plant or tree springing from it, the primary seance of ὑπο is) under, ὑπο ὑπο, under a field. Further, the root of a tree is the cause of its growth; hence ὑπο denotes the cause or agent of the action specified in conjunction with it. "And they were baptized by him, ὑπο ὑπο, he being the cause of their baptism." Finally, as a root shoots upwards, so as to appear above the ground, ὑπο is sometimes to be rendered from under ὑπο ὑπο from under the yoke ὑπο, (from the same Hebrew origin with ὑπο; and as the root is the origin of a thing, it denotes beginning, cause, motive, and is rendered) from. As by the use of ὑπο, the attention is directed backward to the beginning of motion, its governed noun is an ὑπο, in the genitive. He was not able to see Jesus, ὑπο ὑπο ὑπο from the crowd, because he was standing the cause of his inability. From signifying beginning, ὑπο came to express the exact point of time at which motion begins. They went from slipper, ὑπο ὑπο, i.e. immediately after slipper. It expresses also the distance to which a thing has advanced, in consequence of moving, ὑπο ὑπο, the land. The consequent of distance in most cases is separation, or privation, ὑπο ὑπο ὑπο, from their arms, i.e. without them. Taken in this sense, ὑπο, abbreviated into ὑπο, in Latin ab, becomes ὑπο, and compounded with nouns, adjectives, and verbs, imparts to them a contrary signification: ὑπο ὑπο, υπο ὑπο, as in Latin-like. On the contrary, the effect of distance in some cases is increase, as a stream grows larger the farther...
it flows from its source, or as a tree becomes greater with its gradual expansion from the root. For this reason it is abbreviated, sometimes increases the signification of its compound.

The Greek surpasses almost all other languages in the number and variety of its terms; and the cases of its superior copiousness are, 

1. The many dialects which it comprehends, and which served to divide by accidental corruption the same primitive into many words;

2. The facility with which nouns combined with the personal pronouns in the formation of verbs, and the great variety of ways the noun may be converted into verbs, so as to form distinct verbs, yet allied in sense and found to each other;

3. The various ways in which verbs, adjectives, and participles have been changed into abstract nouns; and

4. The great multitude of compound terms, formed by the union of verbs or adjectives with nouns, and of propositions with verbs. The combination indeed of prepositions with simple verbs is the most fertile cause of the extent and comprehension of the language. The simple verb \( \phi_{\nu} \), thus combined, has given birth to no less than \( \phi_{\nu} \tau \phi_{\nu} \) compound verbs. This single instance sufficiently shows the genius of the language, and proves that, however few its simple primitive words may have been, its derived and compound words are in a high degree voluminous and varied, yet connected by an obvious and uniform analogy, both in regard to the formation and the meaning of each term.

But this language is not less remarkable for the harmony of its structure, than for the comprehension and variety of its terms. The perfection of its language, as well as of music, depends on the melody of its sounds; their measure or rhythm, their variety, and their fruitableness to the subject, which they are meant to describe or express. The circumstances of the Greeks in the earliest periods of their society, rendered them peculiarly attentive to all these objects. They lived continually in crowds; all matters of consequence were decided by the voice of the assembly, and, next to the force of his arms, every warrior felt himself indebted to the persuasive accents of his tongue. The perpetual necessity of employing the power of eloquence, during the infancy of their political state, made them retain the original tones and cadences, by which, as yet unpracticed in the use of arbitrary signs, had made known their affections and their wishes. These tones and cadences, imitating the language of action, (the first and most natural language of savages,) possessed a degree of energy and of warmth which can never be attained by the mere artifice of articulate sounds. By uniting them to these sounds, the Greeks gave all the force of a natural to an arbitrary sign. Music and action were incorporated in the fulness of their speech; and the descriptive power of words was extended to all those objects which can be characterized by sound and motion, or which the various modifications of those qualities can suggest to the mind of man. Gillies, Hist. of Greece, vol. ii. p. 233.

GREEK. \textit{moder} or \textit{vulgar}, is the language now spoken in Greece, and called \textit{Modern Greek}, from Constantinople being called \textit{Roma Nova}.

There have been few books written in this language, from the taking of Constantinople by the Turks; scarcely anything but some catechisms, and the like pieces, composed or translated into the vulgar Greek, by the Latin missionaries.

The native Greeks are contented to speak the language without cultivating it; the Turkish policy not allowing any of the subjects of their emirates to apply themselves to the arts and sciences.

GREEK. It is not easy to assign the precise difference between the \textit{vulgar} and the ancient Greek: it consists of the terminations of nouns, pronouns, verbs, and other parts of speech, which make a difference between those two languages much like that observed between some of the dialects of the Italian or Spanish: we inflect in these languages as being the most known; but we might have said the same thing of the Hebrew, Slavonic, &c. dialects. The modern Greek also curtails words, runs them into one another, and adds a fort of elocut 'c particles to the end of them; it confounds the vowels \( \varepsilon , \iota \), and the diphthongs \( \alpha \varepsilon \) and \( \varepsilon \iota \), which they pronounce and often write only \( \iota \). They likewise often confound cafes, moods, tenses, and particles. See Brehmwood's Inquiry concerning the Diversity of Languages, \&c. chap. 2.

Besides, the modern Greek has divers new words not in the ancient; particularly several participles which appear as expletives, and which are introduced to characterize certain tenses of verbs, and other expressions, which would have had the same meaning without such particles, had custom dispensed with them; divers names of dignities and offices unknown to the ancient Greeks; and abundance of words borrowed from the vulgar tongues of the neighbouring nations.

Accordingly one may distinguish three ages of the Greek tongue: the first ends at the time when Constantinople became the capital of the Roman empire; not but there were several books, especially of the fathers of the church, written with great purity after that time; but as religion, law, and policy both civil and military, began then to introduce new words into the language, it seems necessary to begin the second age of the Greek tongue from that epoch, which lasted to the taking of Constantinople by the Turks, when the last age commences.

GREEK \textit{Lexicon}. See \textit{Lexicon}.

GREEK \textit{Majesty}. See \textit{Masonry}.

GREEK \textit{Mafa}. See \textit{Mass}.

GREEK \textit{Monks}. See \textit{Anachoret}.

GREEK \textit{Orders}, in \textit{Architecture}, are the Doric, Ionic, and Corinthian; in \textit{contradistinction} to the two Latin orders, the Tuscan and Composite. See \textit{Orders}.

GREEK \textit{Pitch}. See \textit{Pitch}.

GREEK \textit{Rites}, or \textit{rituals}, is distinguished from the Latin. See \textit{Rite}.

GREEK \textit{Statue}. See \textit{Statue}.

GREEK \textit{Testament}. See \textit{Bible and Testament}.

GREEK \textit{Valentia}. See \textit{Valerian}.

GREEK \textit{Ward}. See \textit{Ward}.

GREEK \textit{Year}. See \textit{Year}.

GREEN, in \textit{Biography}, an organ-builder, on the model of Sancta, whom he succeeded, and has left behind him monuments of his skill and ingenuity in many of our churches and manorid of the nobility and gentry. To this modest and ingenious man, ever ready to adopt any hint tending to the perfection of his art, we are indebted for the improvement of the mechanism of the most noble and comprehensive of all instruments, having eafed the touch, voiced the pipe, and contrived a foot of the whole instrument, in a manner superior to any of his predecessors. He died when scarcely arrived at the middle of the period of mortal life.

GREEN, \textit{Matthew}, was born, probably in London, about the year 1696. He was educated among the diversers, and his learning extended to the knowledge of a little Latin. At this period, those who differed from the established church were rigid in their principles and gloomy in their manners. He appears to have been, on this account, dif-
gulled with those who were the associates of his youth, and to have completely abandoned the party. He speculated freely on religious subjects, and length adopted the system of outward compliance with established forms. At one time he appeared to be ready to join the quakers, but something occurred which prevented him from making an outward profession of their principles. His circumstances were very narrow, but he was fortunate enough to obtain a place of some trucl in the Custom house. He died at the age of forty-one, in the year 1735. His disposition was remarkably mild, and his conversation abounded with wit. He was subject to low spirits: as a cure for this, he composed the work by which, as an author, he is principally known, "The Spleen." This poem presents a picture of his mind and manners, which implies a practical philosophy of the sober and rational Epicurean call. The other works of Mr. Green consist of "The Grotto;" "Verdes on Bar- chay's Apology;" "The Seeker;" and some smaller pieces. In manner and subject," says the critic, "they are some of the most original pieces in the language: they rank among the easy and familiar, but are replete with uncommon thoughts, new and striking images of remote ideas by some unexpected latitude, in which wit principally confils. For poems which bear more repeated perusals; and with those which, full utter them, they do not fail to become favourites." Gen. B. G. E.

GREEN, one of the original colours of the rays of light. Grafs and herbs, and even all vegetables in places exposed to the open air, are green; and those in subterraneous places, or places inaccessible to the air, white and yellow. Thus when wheat or the like germinates under-ground it is white or yellow; and when it is in the open air, green; though this too is yellow before it be green.

GREENS, Artificial, are very rarely simple colours, but produced by mixture of yellow and blue.

Two powders, the one blue, and the other yellow, well mixed, appear perfectly green; though, when viewed with a microscope, we observe a chequer of blue and yellow.

The tincture of red roses with oil of tartar per deliquum, or with spirit of sul ammonia, produces green. The tincture of many red flowers is changed into green by an alkali. The tincture of red roses, and the yellow tincture of crocus, or the blue tincture of cyamus, and the white spirit of sul ammonia, produce green. The formation of verdigris becomes colourless by the affinity of the spirit of nitre, and by the affinity of the oil of tartar it becomes green again.

As no vegetable has yet been discovered, which is capable of giving to cloth of any kind a permanent green colour, the dye for this purpose is a compound colour, formed in dye-vats either by putting a yellow on a blue ground, or a blue on the yellow ground, or by mixing the blue and yellow materials, and dyeing with them as with a simple colour. The common and most permanent green is given to woollen cloth in the following manner. The cloth, being first dyed blue in the indigo vat (see Indigo), is then well scoured, and afterwards dyed in a bath of weld or any other yellow dye with alum and tartar, as in the mode of dyeing of simple yellows, except that the yellow materials are used in greater quantity than the yellow alone of equal body would require. Very deep greens are made to acquire a light brown or kind of burnish by adding to the bath small quantities of logwood and sulphat of iron. As for flax, they are first strongly scoured, then dyed yellow with weld, and afterwards mixed in the indigo vat. Silk, cotton, and linen are dyed green in the same general mode, but with considerable variations in the different processes. The most beautiful green hitherto known, and which perfectly well reлитs the action of light and air, is given by the composition of Prussian blue and yellow, but this colour is destroyed by soap and alkalies. To cotton this colour is given, by first treating it olive with weld, or any other yellow dye, and a compound mordant of alum and iron, and then raising the green by prussic acid. (See Prussian blue.) But all these works, that in the proews for this purpose there seems to be a mutual distribution of the mordants and colours, the Prussian colour taking the iron and becoming blue, whilst the alum and weld remaining in the olive form a faf yellow, and unite with the blue into a fine green.

The only simple green in common use is that of the carbamati oxide of copper precipitated from verdigris by an alkali. A solution of verdigris is made in vinegar, and a few hours before dyeing a solution of as much pears as verdigris is added to it, the mixture is heated, and the cotton, previously emulced, is passed through this bath. The colour then given is a soft apple-green. Aikin's Dict.

The dyers make divers shades, or calls of green, as light green, yellow green, grofs green, laurel green, sea green, dark green, parrot green, and columb green.

GREEN, Brunswick, is a pigment used by some of the German artists, which they prepare by adding to the folution of one part of muriated ammonia in cold water, three parts of copper chippings; and by covering the glads vessel that contains it with gaude fo as to keep out the duf, and placing it in a warm situation, so that the moisture may evaporate, which purpose will be effected in a few days. The muriated of ammonia foam begins to be decomposed by the copper, which is corroded and converted into a green oxysi. When the whole is evaporated to dryness, let it be digested in two or three successive portions of spirit of wine, as long as any green oxysi is taken up; then add the solutions together and expel the liquor by a gentle heat, the residue is a pure dark green sub-mariat of copper, known in the shops by the name of refined Brunswick green.

GREEN, Mountain, or Hungary green, is a fort of greenh powder found in little grains, like sand, among the mountains of Kermanent in Hungary, and thole of Moldavis. Though some hold, that this mountain green is fictitious, and the fame with that the ancients called fit utris, prepared by calling water, or rather wine, upon copper red-hot in the furnace, and catching the flames thereof on copper plates laid over for that purpose: or by dissolving copperplates in wine, much in making verdigris. The painters make use of this colour for grafs green. It is sometimes counterfeited by grading verdigris with ceruff.

GREEN, Cokined, and plain green. See Verdigris.

GREEN, Prussian. See the proews for making Prussian blue.

GREEN, Sup. See colours from Fruits, Buckthorn, and Sap-green.

GREEN, Saxan, an extremely beautiful green colour, so called because the blue part is given by the Saxan blue or sulphat of indigo; the proews of dyeing which is this; the cloth or silk is first to be dyed a Saxan blue, in the following manner. Having ground nine parts of indigo with twenty of red arceo into a fine powder, add forty-eight parts of strong spirit of vitriol; which mixture swells, grows hot, and emits a sulphurous smell. After standing in a moderate warmth of twenty-four hours, pour off the liquid part, which will be of an extremely deep blue. A small quantity of this liquor, drop into hot water, instantly spreads, tinges it of a fine light blue, and fits it for dyeing.
the prepared wood, cloth, or silk; and by increasing or diminishing the proportion of the blue composition, the colour may be rendered deeper or lighter. This, Dr. Lewis says, is the method used for preparing the blue composition by the dyers of Norwich, who purchased this secret from Saxony.

The cloth or silk, thus dyed blue, is next anamed, and then dipped in the yellow decoction of weld or suffolk, and the desired colour will be obtained.

Suffolk is commonly preferred as the yellow material, because it is less liable to be altered by the adhering acid of the sulphate of indigo than weld or the other yellows. To correct this effect of the acid, and enable quercetron to equal the Suffolk in this respect, (whilst its natural colour much exceeds it,) Dr. Bancroft advises, after the cloth has received the blue, to mix with the alum mordant, in order to neutralize the adhering acid, before the yellow is given.

For the fulling it may be dyed green at one operation, by boiling it for a little time in a mixture of the blue and yellow liquors. For this purpose the cloth is first anamed and well rinsed; and the cloth is then dyed in a strong decoction of fulling, to which, when cooled to a blood heat, is added sulphate of indigo. Dr. Bancroft recommends for dyeing a beautiful Saxon green, the following expediency proceeds, by using the compound alum and tin mordant; put into the boiler six or eight pounds of quercetron bark to every one hundred pounds of cloth boil with a sufficient quantity of water; then add six pounds of the nitro-sulphate of tin, (in preference to the nitro-muriate,) and four pounds of alum; when these have boiled five or six minutes, lower the heat with cold water to blood-warm, after which, add as much sulphate of indigo as may be thought necessary for the intended depth of colour, and then dye the cloth in this bath with proper care. Aikin's Dict.

By combining any blue and yellow dyes, in different proportions, all the shades of green may be produced, from the bluish green of the cabbage-leaf to the greenish-yellow of the cabbage-leaf.

GREEN, in Agriculture, a term provincially signifying grass-land, or such as is in the state of turf.

GREEN, in Geography, a county of America, in New York, taken from Ulster and Albany counties, bounded on the N. by Albany and Schoharie, E. by the river Hudson, S. by the county of Ulster, and W. by the county of Delaware; 30 miles in length from E. to W., and from 12 to 20 in breadth. The number of its inhabitants is 15,767, and its chief town is Catskill. — Allo, a county of Pennsylvania, bounded N. by Washington, S. and W. by Virginia, E. by Monongahela river; 33 miles long, and 18 broad. The number of its inhabitants is 865. — Allo, a county of Kentucky, extending from Ohio river on the N. to Tenessee state on the S., and bordering W. on the Mississipi river, and E. upon Hardin and Jeffferson counties. The number of its inhabitants is 6,025, of whom 816 are slaves. — Allo, a county of N. Carolina, in the district of Newbern, containing 4218 inhabitants, of whom 1406 are slaves. — Allo, a town in Kennebec county, and state of Maine, situated on the E. side of Androscoggin river, 164 miles N.E. from Boston; containing 933 inhabitants. — Allo, a post-town in Franklin county, Pennsylvania, situated near the Connequeague creek; 176 miles W. by S. from Philadelphia; containing about 83 houses, 2 German churches, and a Presbyterian church, and 884 inhabitants. — Allo, a township in Franklin county, and also a township in Washington county, in the same state. — Allo, a navigable river of Kentucky, which rises in Mercer county, has a gentle current, generally in a W. direction, and is navigable nearly 150 miles; at its confluence with the Ohio it is upwards of 200 yards wide. — Allo, a small river which rises in the town of Marlborough, in Vermont, and falls into Connecticut river, above Deerfield, in Massachusetts. — Allo, a river of New Brunswick, which runs into the St. John, N. lat. 47° 20', W. long. 67° 38'. — Allo, a river of Canada, which runs into the river St. Lawrence, 166 miles below Quebec.

GREEN Bank, one of the banks near the island of Newfoundland; 129 miles long, and 48 wide. N. lat. 45° 30' to 46° 50'; W. long. 53° 30' to 53° 50'.

GREEN Bay, a bay on the W. side of Lake Michigan, about 50 miles long, and 15, 20, or 30 broad in different parts, lying nearly from N. to S. At its entrance is a string of islands extending N. to S., called the "Grand Traverse." There are about 30 miles in length, and serve to facilitate the passage of canoes, as they afford them a shelter from the winds. The communication between Lake Michigan and the Green bay is sufficiently deep for a vessel of 60 tons, with a proportionable breadth; the land adjoining to the bottom of the bay is very fertile, the country generally level, and the views of it agreeable and extensive. The inhabitants of its coasts call this bay the Menominee bay. N. lat. 45° W. long. 87° 58'. — Allo, a bay on the E. coast of the island of Antigua, S. from Green island.

GREEN Briar, a large and fertile county of Virginia, surrounded by Bath, Randolph, Harrison, Kanawhaw, Botetourt, and Montgomery counties; about one hundred miles long and 45 broad; containing 3304 free inhabitants, and 271 slaves. The chief town is Lewisburg; 163 miles W. of Staunton. — Allo, a river of Virginia, which purifying a S.W. course, runs into the eastern side of the great Kanawhaw. N. lat. 37° 57'; W. long. 89° 58'.

GREEN Bug, in Agriculture, the name of a small insect, which is often found destructive to different plants in both fields and gardens. It also frequently proves destructive to hop crops. It is very difficult to destroy it in many places.

GREEN Chef., in Rural Economy, the name of that sort of chaff which is prepared with some kind of green vegetable juice, as that of cabbage and other similar plants.

GREEN Copperas. See COPPERAS, and Sulphate of Iron.

GREEN Creek, in Geography, a river of Pennsylvania, which runs into the Susquehanna. N. lat. 40° 58'; W. long. 76° 30'.

GREEN Crop, in Agriculture, that sort which is formed of some kind of green vegetable; such as that of some sort of artificial grass, the turnip, cabbage, tare, rape, &c., which are so termed in contradistinction to those of the grain description. The introduction of crops of this nature between those of the grain kind, has constified one of the most important improvements in modern agriculture. By this means, land has not only been prevented from being exhausted and worn out, but brought into the most proper condition for the growth of grain, without undergoing the injurious processes of naked or summer following. It has likewise had the effect of greatly increasing the number, and improving the quantity of all sorts of live stock, in consequence of their having more abundant supplies of food, and these at the same time of better qualities. There can therefore be no doubt of the great advantage of these crops, which should of course be grown as extensively as possible by the farmer, as by them he may be enabled to support much larger stocks of cattle and sheep than could otherwise be the case, and at the same time raise much larger quantities of good manure. See MANURE. Besides, new, great advantages might, in different instances of cattle-farms of the breeding kind, be derived
rived from the more extensive cultivation of such green crops as the winter support of the flock.

And crops of this nature have likewise been found of extensive utility in the breeding of milk-cows in winter dairying, as is fully shown in the various trials made by J. C. Curwen, esq. in a northern district of the kingdom, in the view of supplying the poor of a large town with milk. The value of which crops in this sort of application, on the supposition of their being sold to the cow-keeper, and the expenses of their cultivation, are stated in the following manner.

Green Crops.

Twenty-two acres of green crop, at 10d. per acre

Expenses of raising and cleaning.

Four acres of cabbages, at 12d. per acre

Two acres of Swedish turnips, at 5s. per acre

Six acres of common red turnips, at 4l. per acre

One acre of Kaldrabi

Nine acres of rape or cole, at 3l. per acre

---

118 10 0

Gain on crops £ 101 10 0

It is considered that the improvement of the land, and the value of the succeeding crops, are fully adequate to the rent and taxes.

This statement shews in the most clear point of view the vast benefit of this kind of crops even in this sort of application, and that they should not be disregarded by those engaged in the busines of husbandry. But in some other modes of application they will be found far more important and beneficial.

By some they have also been considered as of great utility when turned into the field by way of a manure, though others are wholly of a different opinion; probably in consequence of the trials having been made in very opposite descriptions of soils, and under very different circumstances of them. It is extremely probable, likewise, that the advantage of this practice will be much greater where the crops are turned in during the summer months than in other cases, in consequence of their running more quickly into the putrefactive state. It has been advised, that whatever may be the nature of the crops, they should be ploughed under by means of a skim-coultor plough, as constituting the only means of turning them in, in so complete a manner as wholly to conceal them. And that, in case of fowling the land with broad cast turnips, the work should be performed at least three weeks before the feed is put into the soil, and that it should be afterwards only very slightly harrowed in. See Turning in Green Crops.

Green Earth, in Mineralogy, Feldspars, Saff.; Chloride of Nitrate, Boiling; Argilla vermiculata, Weirm.; Graméens, Weirm.; Kali chlorate hygrophilus, Haüy; Ferra di Terrone, Ferra di Brenteria, Ita.; Veronef earth, an earthy substance belonging to the argillaceous genus. Its colour is indicated by its name, but there are several shades of it, the principal of which are verdigris, and celadon green, passing sometimes into black and mountain green, frequently with an admixture of grey; it has also been observed of a more or less pure olive green.

**G R E**

It occurs massive and disseminated, in rounded and angular fragments, and in globular concretions; likewise in grains mixed with sand, and as coating onagate balls, in the hollows of amygdaloid, (toad-stone,) &c. Internally it is dull, but on the riffs a fat-like lustre is sometimes observable.

Fracature fine-earthy, or more or less flat conchoidal, approaching to flaky. Divisible into indeterminately angular, blunt-edged, opaque fragments.

It feels rather greasy, is always more or less soft, mild, and easily frangible; streak rather thinning; adhesion to the tongue inconsiderable. Specific gravity about 2 1/2.

The chemical charaters of green-earth, derived from Klaproth's analysis of three varieties, viz. those from Monte Baldo, in the Veronese, from Cyprus, and from East Prussia, are the following:

The green-earth from Monte Baldo, when heated to redness, loses five per cent. of its weight, while its hardness is considerably increased. The fragments thus subjected to the fire become externally of a yellowish-brown colour, internally greyish-black and glintening. That of Cyprus, after ignition, loses eight parts of its weight; and its colour is converted into dirty brownish-yellow. Exposed to the fire of the porcelain furnace in the charcoal crucible, it fuses to a somewhat porous greenish glafs, externally of a dirty-green colour, internally of that of emerald; in the clay crucible it is converted into a greenish-grey flag. The green-earth of New East Prussia, when freed from the admixed sand by elution, and ignited, changes its green colour into light leather-brown; the conglomerated particles are converted into a hard mass, and thus lose nine per cent. of their weight. The acids do not act upon green-earth, and they leave its colour unaltered.

The results of the analyses of the above three varieties were:

<table>
<thead>
<tr>
<th></th>
<th>Green-earth of Monte Baldo</th>
<th>Green-earth of Cyprus</th>
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<tbody>
<tr>
<td></td>
<td>in the Veronese.</td>
<td>in East Prussia.</td>
</tr>
<tr>
<td>Silica</td>
<td>53</td>
<td>51.50</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>28</td>
<td>20.50</td>
</tr>
<tr>
<td>Magnesia</td>
<td>2</td>
<td>1.50</td>
</tr>
<tr>
<td>Kali</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Water</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Losses</td>
<td>1</td>
<td>0.50</td>
</tr>
</tbody>
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Klaproth, B. & T. vol. 4. November 100 ibid. 100

<table>
<thead>
<tr>
<th></th>
<th>Green-earth of New East Prussia.</th>
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<tbody>
<tr>
<td>Silica</td>
<td>51.</td>
</tr>
<tr>
<td>Alumina</td>
<td>12.</td>
</tr>
<tr>
<td>Magnesia</td>
<td>3.50</td>
</tr>
<tr>
<td>Lime</td>
<td>2.50</td>
</tr>
<tr>
<td>Oxyd of iron</td>
<td>17.</td>
</tr>
<tr>
<td>Natron, with a trace of kali</td>
<td>4.50</td>
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<tr>
<td>Water</td>
<td>9.</td>
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<tr>
<td>Losses</td>
<td>50.</td>
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Ibid. 100

The Prussian green-earth, by thus differing from the two others, particularly with regard to the alumina as a constituent part, appears to approach the nature of chlorite.

Green-earth occurs principally in amygdaloid, also as incrustation on the nodules of zeolite, &c. contained in the cavities; sometimes as coating the sides of these cavities, which are often partly filled with the earth. It is also, though less frequently, found in porphyry and basalt, as nodules in the newer sandstone, and even in the rocks belonging to the new flint-strap-formation, such as at Afshin in
in Bohemia, where calcareous tuff is seen alternating with narrow layers of a conglomerate, made up of grains of calcarceous spar, and blunt-edged fragments of the tuff to which the green earth serves as the cementing substance. But in the same place green-earth forms a flat-tz-layer of a foot in thickness, whose base consists of wacke-like clay and calcareous tuff; the roof of indurated marl. The green-earth of New East Prussia, consisting of earthy particles, mixed with a coarse sand, forms a considerable bed in the neighbourhood of the river Memel, between Loffofna and Sallowraye.

Among the localities, besides those of Monte Baldo in the Veronese, Cyprus, Prussia, and Bohemia, already pointed out, the following may be mentioned: Altenburg, and Planitz, in Saxony; Oberklein, in the Palatinate; Koenigstein, in Hungary; Pontauensiper, in Normandy; Scotland, Iceland, the Ferro-islands, and wherever true amygdaloid occurs.

This earth is used as a pigment, particularly for water-colour painting, and being very durable, and not too expensive, alo for house painting, &c.

The green-earth of Cyprus, according to Mariti, is sold at 4½ piasters for a measure of 100 cakes. It is carried from the pit in large baskets made of the palm-tree; three of these baskets generally contain the above mentioned quantity. A great deal was exported to Holland; often by way of ballast.

That of Bohemia, above mentioned, is sold, according as its colour is deeper and its grain finer, from two to four florins the cwt. Part of it is also burnt there in small kilns, and sold as a red pigment.

By the Italians green earth is called Verde di Brentonico, from the vicinity of Monte Balca to a place of that name.

Green fellow, in Agriculture, a term often applied to such arable land as is rendered clean and free from weeds, by means of green crops, without having recourse to the processes of naked or summer following. This constitutes one of the numerous improvements in modern husbandry. See FALLOWING OF LAND.

Green Finch, in Ornithology. See Loxia Chloris. See also Tanaagra Greaca, and Fringilla Lutyracea.

Green Fish. See Cod-Fishery.

Green Food, in Agriculture, that part of food which is employed in its green or succulent condition, in the feeding, foddering, and supporting of various kinds of live stock. This is a part of food that has, within these late years, been much more extensively employed than was formerly the case; yet its advantages are probably in general not so fully understood as they ought to be. Its importance and utility will, however, soon appear by the making of a few experiments in a proper manner.

Green Glass. See Glass.

Green Hare, or green-hog, in our Old Writers, the same with wart in foresets, &c.

Green Hides, are those not yet tanned, or dressed, but such as are taken off from the carcases. See Hide and CURVING.

Green Iron Earth. See Irox.

Green Island, in Geography, a small island among the Philippines, near the S. coast of the island of St. Lucia. N. lat. 13° 30'. E. long. 121° 2'.—Alfo, a small island in the East Indian Sea. S. lat. 6° 5'. E. long. 123° 30'.

Alfo, one of the smaller Bahama islands. N. lat. 21° 48'. W. long. 71. 5.—Alfo, one of the lefier Virgin islands, called Likewise "Serpent island," situated near the E. end of Porto Rico.—Alfo, a low woody island near the N. E. coast of New Holland; 12 miles E.N.E. of Cape Grattan. S. lat. 16° 48'. W. long. 214° 5'.—Alfo, an island in Hud-
This rock, with a view to the periods of its formation, is divided into primitive, transitory, and flint green-flone.

The primitive green-flone is generally distinguishable from the others by its highly crystalline structure. The hornblende, in which a tendency to crystallization is almost always observable, generally constitutes the predominant ingredient; but sometimes this is only apparently so, the feldspar being not seldom hidden by it in such a manner, that it bears the greatest resemblance to small laminae of hornblende. In this case the blow-pipe discloses the illusion by melting the hornblende; when the feldspar recovers its usual whitish colour, and is converted into a white glass.

Werner subdivides primitive green-flone into four varieties:
1. Common green-flone, in which the two ingredients, mixed in different proportions, form a granular mass.  
2. Porphyritic green-flone, being the common variety, including large crystals of feldspar.  
3. Green-flone porphyry, in which the granular basis, which is with difficulty distinguishable, includes crystals of feldspar.  
4. Green porphyry, in which the granular nature of the basis is no longer visible to the naked eye; it appears uniform and simple, with a blackish green or phænacol green colour, and includes crystals of compact feldspar. (Jamefon.)

There are to be referred the porfido nero, and porfido verde antico of Italian antiquaries, of which we shall say more hereafter. The third and fourth of these varieties might, we think, be safely united; at least the definition given of them does not indicate any difference, except in the shade of green.

This old green-flone appears sometimes stratified. Gneifs is the rock in which the different varieties first appear; the next rock in which they occur is mica-flate, but the beds of green-flone in either of them are scanty and inconsiderable; they are observed more numerous and of greater extent in clay flate in Scotland. According to Mr. Jamefon, the clay-flate and mica-flate, that form a great portion of the country extending from Loch Lomond, by Callander, Comrie, and Dunkeld, contain numerous beds of green-flone; and there, we are informed by this geognosian, as in all other countries, the clay flate contains more numerous and larger beds than the mica flate.

There is a vast number of varieties of primitive green-flone in Bohemia; but it is found in the Saxony district of that country, where it yields chiefly on green-flone. It occurs there also with quartz as a constituent part. The varieties mentioned by Reufc, as being found there within a narrow compass, are:
1. A small mixed grained mixture of velvet black hornblende, which exhibits a tendency to a prismatic crystalline form, with yellowish white feldspar, and greenish-white and smoke grey quartz. The hornblende is the predominant part; the quartz is here and there entirely wanting; the mixture pretty uniformly granular.
2. A variety in which the hornblende is seen in groups, distinct from those of the feldspar and quartz; so that the whole forms an interlacing of black and yellowish-white spots.
3. A variety in which the hornblende is so prevalent, that feldspar and quartz can with difficulty be distinguished by the examining glasses, which discovers these ingredients collected into small spots and flrips; it contains also here and there some sheets of mica.
4. Var. in which the hornblende is seen partly massive, in spots, flrips uniformly blended with the feldspar and quartz; partly in small circular crystals; they are divergingly aggregated, or crofs each other in all directions; feldspar tile and brownish feldspar; quartz only here and there in smoke grey grains.
5. Var. in which the hornblende shows a strong tendency to crystallization, and is much accumulated in some places; though, generally speaking, its proportion to the mixture of yellowish-white and reddish-grey feldspar and greyish-white quartz, is but small; it contains larger and more numerous flakes of silverly and yellowish-white mica. 6. Var. in which the texture becomes more thick-flaky; the smoke-grey quartz becomes predominant, the yellowish-white feldspar disappears almost entirely, and the hornblende is only thickly differentiated.
7. Var. in which the yellowish-white and reddish-grey feldspar predominates over the hornblende, which is seen partly massive and in fine granular concretions, partly in inflated and dispersed minute fix-seeded prisms, imbedded in the feldspar; while the quartz is entirely wanting. It is remarkable that in this district the primitive green-flone is seen, by flow gradation, to pass over into perfect gneifs. The more it approaches the latter, the more the granular texture becomes indistinct; the rock adopts a thick flaty texture, the hornblende is seen more and more to diminsh, while the mica increases both in quantity and size, until perfect gneifs stands confounded as the constituent rock.

This rock is common also in many other parts of Europe; but the accounts we possess of the green-flone of several countries is too imperfect to enable us to determine how much of it may be considerd primitive.

The transition green-flone is not easily distinguishable in specimens. It is characterized by Mr. Jamefon as being "a fine granular mixture of hornblende and feldspar; and sometimes the mixture is so intimate, that the constituent parts are not to be distinguished. Quartz sometimes traverses it in the form of veins, or is disseminated through it; a character which distinguishes it from flint green-flone, which rarely contains quartz. Sometimes it occurs in globular distinct concretions, and these again consist of curved lamellar concretions, forming the globular rock (kugelfels) of Voigland. Sometimes it is penetrated with reddish brown oxide of iron, which, combined with the dark-brown hornblende, gives the rock a liver-brown colour; hence it is denominated in Voigland, where it occurs, leber-fels, or liver rock. Beds of it occur in the upper part of Dunfrieshire, in the Hartz, Bohemia, &c."

Flake-green-flone. Prof. Jamefon, in his "Mineralogical Description of Dunfrieshire," has given a short account of the occurrence of green-flone in the independent coal-formations, and Mr. Filif has discovered beds of amygdaloid in the first or oldest flint-lime-flone; whereas the former author concedes himself entitled to introduce what he terms the flake-trap, which is distinct from the flint newer formation called the new float-trap by Werner. In the independent coal formation it occurs in beds from one foot to many fathoms in thickness; it contains imbedded olivine and augite, and is traversed by numerous veins of calc-fspar; it often also contains fussy cavities, which are lined with calc-fspar, quartz, barites, cubicite and prismatic; and the cavities are sometimes filled with water.

The green-flone of Werner's new float-trap formation is, upon the whole, distinguishable from the older formation, by its structure being of a less crystalline appearance, and by its distinct concretions approaching more to the coarse granular. Its colour usually inclines more or less to green. Certain varieties are reddish, and these are denominated sementic green-flone. When fresh and rather large granular, it usually exhibits a simple structure; when, on the contrary, it is disintegrated, and smaller granular, it occurs in globular, and there again in curved lamellar distinct concretions. Certain varieties approach to wacke, and these are usually vesicular, and form a kind of amygdaloid. It is sometimes very distinctly stratified, and frequently occurs in veins." Jamefon.

The use to which the common green-flone is applied are not
as a manifold. As it frequently contains a considerable portion of iron, and is sufficiently fusible, it serves for a flux in the iron work in Smolend. Of the porphyritic varieties of the primitive green-flone used for ornament, the following deserve to be mentioned:

Antique black porphyry (porfido nero antico). There are two or three varieties differing, with regard to the intensity of the colour, from greenish-black to brown-black; and likewise with regard to the size of the whitish feldspar-crytals: in one of them the crytals are very finely, and this is more frequently seen among the remains of antiquity than the others.

Mr. Graaf in his Miraculi of Allace, mentions a black porphyry as occurring at Pontmont; and also as rounded blocks in the river Ill.

In the black Corian porphyry, the feldspar-crytals have a slight tint of green, like those of the antique green porphyry. Similar to a Laridian black porphyry, and Sardinian of one found in the neighbourhood of Ceres, which, besides small prismatic crytals of feldspar, includes rounded grains of transparent colourless quartz. The latter addition is likewise observed in a variety of a blackish Sardinian porphyry, which is sometimes wrought for ornamental purposes.

Antique green porphyry (porfido verde antico). This is the ophite of the ancients; a name derived from some supposed resemblance of this rock, when polished, to the skin of a serpent; whence, in modern times, antiquaries have referred the porphyry in question to the magnumian stone called serpentine, a mixture of which, with primitive lime-flone, constitutes the rock called verde antico. When once considered as the same with the real serpentine, the name verde antico, of course, also was equally applied to the green porphyry; a circumstance which has been productive of great confusion. There are now few monuments of ancient art executed in this porphyry to be met with.

There are some varieties of green porphyry, much resembling the antique, still found in several parts of Europe. There is a quarry of it on Monte Vito, in Piedmont; which, besides the feldspar, contains reddish grains, supposed to be garnets.

The green Corian porphyry, found in the district of Niotto, in Coriana, has a deep bottle-green base, and fine white feldspar crytals another, which contains some dark red garnets, occurs in the district of Golfo in the same island.

Sardisia describes the green porphyry of Gavone, resembling the black porphyry above-mentioned, in the figure and colour of the feldspar and quartz, but differing in its base, which is light green and, in fragments, transluèd at the edges. Both this and the black take an excellent polish.

The green porphyry of the Pdfes has a dark green base, and contains numerous middle-sized feldspar-crytals of a pale green colour. It is found at La Chevetray, on the heights of Frede and Comte, and made use of for ornamental purposes. In another variety, found not far from this quarry, the feldspar-crytals are so preished against each other, that they are ill-formed, and conceal almost the whole of the base. They are manufactured into slabs for tables, chimney-pieces, &c. and sometimes past by the improper name of green granites.

There is abundance of the green porphyry in the Pyrenees, where it is known by the old appellation of ophite.

Green-flone base, a compound rock, which may be considered as a variety of the preceding, from which it differs in having a distinct flat structure: the feldspar, moreover, being generally more abundant than the hornblende. It ranks with the primitive trap, but, not occurring in rocks older than clay-flone, is considered as the newest of the first classes of the trap formation. It occurs in considerable beds, and in Sweden whole mountains are said to consist of it. Several mining districts are situated in this rock, such as those of Gerzold, in Saxony, of Radolfza, in Silesia, and of Adelfors, in Sweden.

Green Sward, in Agriculture, a name applied to the gras, turf, or sward, by which land is covered while in the state of pasture or under the scythe. Such land as has been long in this state, is most uniformly covered with a close compact sward; while in the contrary case, it is moity light, open, and thin. See Sward.

Green Turtle Bay, in Geography, a small island among the Bahamas. N. lat. 26° 40'. W. long. 77° 59'.

Green Weal is used where effluents are delivered to the fluence out of the exchequer, under the seal of that court, made in green wax, to be leaved in the several counties.

Green Weed. See Broom.

Green Winter. See Winter Green.

GREENAE, in Geography, a town of Denmark, in North Jutland, 28 miles N. E. of Aarhus.

GREENBURGH, a township of Well Cheller, in the slate of New York, containing 1581 inhabitants.

GREENBUSH, a township of Renifable county, New York, containing 3472 inhabitants.

GREENCLOTH, a board, or court of justice, held in the compting-house of the king's household, for the taking cognizance of all matters of government and justice within the king's court royal; and for correcting all the servants therein, that shall any way offend.

To this court also belonged the authority of maintaining the peace for twelve miles round the king's court, wherever it shall be, excepting at London.

The judge of this court was the lord reward, assisted by the treasurer, comptroller, coffler, clerks of the green-cloth, &c. It took its name, greencloth, from a greencloth spread over the board where they sat, whereas were the arms of the compting-house. The clerks of this court were officers who attended there, and had businesses assigned them by the board. All bills of comptrolments, relating to the office, were summed up, and allowed by the clerks comptrollers, and audited by the clerks of the green-cloth. They also appointed the king's, queen's, and household's diet, and kept all records, registers, and papers, relating thereto; made up bills, parcell, and debentures for salaries, &c. and provisions and necessaries for the officers of the pantry, burley, cellar, &c. They also waited upon foreign princes, when entertained by his majesty. This court has been abolished.

GREENE, MAURICE, Dr. in Biography, was the son of the Rev. Thomas Greene, vicar of St. Olave Jeney, in London, and nephew of John Greene, serjeant at law. He was brought up in the choir of St. Paul, and when his voice broke was bound apprentice to Brind, the organist of that cathedral. He was early noticed as an elegant organ player, and was appointed organist for the church, and obtained the place of organist of St. Dunstan in the Weil, before he was twenty years of age. In 1717, on the death of Daniel Pocock, he was likewise elected organist of St. Andrew's, Holborn; but the next year, his master Brind dying, Greene was appointed his successor by the dean and chapter of St. Paul's; upon which event, he quitted both the places he had previously obtained. In 1726, on the death of Dr. Crofts, he was appointed organist and composer to the Chapel Royal; and on the death of Exceis, 1735, master of his majesty's band. In 1730, he obtained the
the degree of doctor in music at Cambridge, and was appointed public music professor in the same university, in the room of Dr. Tudway. Greene was an intelligent man, a constant attendant at the opera, and an acute observer of the improvements in composition and performance, which Handel and the Italian fingers employed in his dramas, had introduced into this country. His melody is therefore more elegant, and harmony more pure, than those of his predecessors, though less nervous and original. Greene had the misfortune to live in the age and neighbourhood of a musical giant, with whom he was utterly unable to contend, but by cabal and alliance with his enemies. Handel was but too prone to treat inferior artists with contempt; what provocation he had received from Greene, after their first acquaintance, when our countryman had a due sense of his great powers, we know not; but for many years of his life, he never spoke of him without some injurious epithet. Greene's figure was below the common size, and he had the misfortune to be very much deformed; yet his address and exterior manners were those of a man of the world, mild, attentive, and well-bred. History has little to do with the infirmities of artists; who being men, in spite of uncommon gifts and inspirations, are subject to human frailties, which enthrall, proufe, and the love of fame, more frequently augment than diminish.

Greene had the honour, early in life, to teach the duchess of Newcastle, which, joined to his professional merit, and the propriety of his conduct, was the foundation of his favour with the prime minister, and the notice of the first people about the court. In 1730, when the duke of Newcastle was installed chancellor of the university of Cambridge, he was appointed to the ode, and then not only obtained his doctor's degree, but, on the death of Dr. Tudway, he was honoured with the title of professor of music in that university. As an exercise for his degree, he set Pope's ode for St. Cecilia's day; having first had interest sufficient to prevail on the author to make new arrangements in the poem to render it more fit for music, and even to add an entire new flanza, between the second and third, which had never appeared in any of the printed editions.

Greene had sense and knowledge sufficient, in his younger days, to value and respect the abilities of the two great musical champions, Handel and Bononcini, whose diffident talents occasioned as much discouragement in the capital as the factions of Whig and Tory. At the same time: as he was impressed with the highest reverence for Handel's great style of playing the organ, and the force of his geniuses for composition, he could not help listening with pleasure to Bononcini's performance on the violoncello, and to the grace and good taste of many of his opera songs; at which, perhaps, Handel took umbrage—for during these feuds, he broke off his acquaintance, and ever afterwards, regarding him as an enemy, never mentioned his name but with contempt. This treatment naturally rendered Greene a partisan on the side of Bononcini, and in 1728 he defended him, as long as he was able, from the charge of plagiarism, with respect to a cantata which had been introduced at the academy of ancient music as Bononcini's, and which was afterwards discovered to be the composition of Lotti, at Venice. See Bononcini.

Greene's merit and connections were such, that he soon arrived at the most honourable appointments in his profession; for besides being organist of St. Paul's, in 1727, on the death of Dr. Croft, he was appointed organist and composer to the Chapel Royal; and in 1735 he succeeded Eccles as composer to his majesty, and master of his band, in which station he held all the offices of the laureate, Colley Cibber, as long as he lived.

The compositions of Dr. Greene were very numerous, particularly for the church. Early in his career he set a Te Deum, and part of the Song of Deborah, which were never printed; but the anthems and services which he produced for St. Paul's and the King's Chapel, he collected and published in two vols. folio; and of these the merit is so various as to leave them open to much discrimination and fair criticism. Among the faults to be ascribed to this composer, none are so flagrant as the light divisions in which his solo anthems abound, and the repetition of passages a note higher or a note lower in what the Italians call ripieno, which are always dull, tiresome, and indications of a florid fancy. The opening of his second solo anthem, vol. 1. p. 26, is very solemn and pathetic, and the organ part judicious and pleasing; but, page 45, Santa Regina tells her bed six times, while one very short passage is finging. "Lord how long wilt thou be angry," alla Poldiriana, for five voices, though none of the subjects are new, seems to us the best full anthem of his composition. The style is clear, the answers are regular, and the modulation such as discovers a familiar acquaintance with the best ancient writers for the church. Of the full anthem; "O sing unto the Lord," for five voices, the fugue in the first movement is well worked, and has a good effect in performance; but the rest of the anthem is not equal in its subjects, or their treatment. "Lord how are they increased that trouble me," seems one of the most pleasing of Dr. Greene's solo anthems. The last anthem in the first volume, for two voices, has many pleasing passages, and rather more variety of subject than most of the others.

The first movement in the second volume seems calculated to display, in the performers, the power of making a shake upon short notice. A shake, judiciously applied, is a brilliant embellishment in a finger; but when lavished, improperly, is pert and unmeaning; nor is it ever more to than upon the first note of a movement. There are not fewer than seventeen or eighteen shakes distributed among the performers in the course of one page, which are more than in modern opera fings of judgment, told; and expression, would use in a month, were his shake ever to good; the rest of the anthem is on common subjects, which are commonly treated.

The two-part anthem, "Thou, O God, art praised," has repeatedly a passage on the word praised, which has to our ear the disagreeable effect of two fifths; and there is a point at "unto thee shall my voice be performed," for which he was manifestly obliged to the second movement of Handel's fourth organ concerto. The rest of the anthem consists of agreeable passages of the times, but nothing like originality appears in any one idea.

"The King shall rejoice," for three voices, is agreeable commonplace. Perhaps that is hardly enough to say of the second movement: "O Lord grant me a long life." "Let my complaint," a full anthem, is very solemn and solid composition.

The anthem for Christmas day has an air of cheerfulness, suitable to the occasion, which runs through the whole composition. "Hear my prayer, O God," has more merit of gravity and expression than most of the anthems in this volume. "O sing unto God," is agreeable music, but too secular in its melody, and return to the subject; "Have mercy upon me;" the two first movements of this anthem

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are sober and affecting; but the second and third have too many vulgar and worn-out divisions; the last chorus, however, is more ecclesiastical, and less common in melody and modulation. The solo anthem; "Hear, O Lord," for a bafe voice, is grave and pathetic, on the model of Handel's bel canto oratorio song. The name may be said of the next, for two voices; "I will seek unto God." "O God of my righteousness(; is superior in the dext movement, joined vere, and chorus, to any thing in the preceding part of this volume; this anthem rimes somewhat above mediocrity. "O give thanks," is wholly written with Corelli's and Handel's materials, though somewhat differently disposed; particularly page 85, where the whole harmony moves together, one note lower, their time, after a crockett left, to this base; E, D, G, E, D, A, G, C. "The Lord is my shepherd," has too many light song-passages in it, notwithstanding the white and squire notes which give it a venerable look on paper. "O how amiable are thy dwellings," is a very agreeable anthem, though the passages were not new at the time it was composed. The movement with an organ accompaniment, in the anthem; "My soul truly waiteth," is well conducted, and not common; the rest of the anthem has merit, particularly the chorus of the last movement. "The Lord, even the most mighty God," for a bafe voice, is set with great gravity and propriety; few anthems, indeed, for that species of voice, are more agreeable; the points, however, in the chorus, are very common. The anthem in eight parts, a due cori: "How long wilt thou forget me," is very well written, a capella, and good music. Indeed, the first movement of this anthem manifests greater abilities than any of his productions that we have seen, who is in general very correct in his harmony, but as to invention and design, he seldom soars above mediocrity. "O Lord give thine ear unto my prayer," for two voices, is very pleasing music, particularly the first movement. The last anthem of this volume is made up of common play-oue passages; the first movement is heavy and monotonous; the audite tiresome, by the repetitions of an old harpichord-lellon passage in the base; the chorus justifies Mr.Mahon's cenure of the author, (colected of the words of anthems) for his too long and frequent divisions; these are too vulgar and rietous for the church, and, indeed, would have no merit of novelty any where. The voices, page 151, upon which the last chorus is built, has more of the dancing minuet, or Vauxhall song, in it, than belong to that species of gravity and dignity which befits devotion. We think we could neither play nor hear this movement in a church, without feeling ashamed of its impropriety.

There is considerable merit of various kinds in the Collection of Catches, Canons, and two-part Songs, published by Dr. Greene; the composition is clear, correct, and masterly; the melodies, for the times when they were produced, are elegant, and designs intelligent and ingenious. It was facetiously said, during the life of this composer, that his peculiar music fault of the church, and his anthems of the theatre. The truth is, he produced but little peculiar music. His song of "Go rofe," was long in general favour, and some of his easy ballads, as "Buffy, curious, thirsty fly;" "Dear Chloe while thus beyond measure," &c. were the delight of ballad-singers fifty years ago. The collection of harpichord students, which he published late in his life, though they discovered no great powers of invention, or hand, had its day of favour, as a boarding-school book; for being neither to elaborate as those of Handel, nor so difficult as the lefions of Scarlatti, or the lessons of Albri, they gave but little trouble, either to the master or scholar. Indeed, as all the passages are so familiar and temporary, they seem to have been occasionally produced for idle pupils at different times, with whom facility was the first recommendation.

Dr. Greene, during the last years of his life, began to collect the services and anthems of our old church composers, from the single parts used in the several cathedrals of the kingdom, in order to correct and publish them in score; a plan which he did not live to accomplish; but bequeathing his papers to Dr. Day, it was afterwards executed in a very splendid and ample manner. Dr. Greene died in 1755, and was succeeded, as composer to the Chapel Royal and master of his majesty's band, by his worthy pupil, Dr. Day.

GREENE, in Geography, a county of Washington district in Tenefee, containing 7610 inhabitants, of whom 471 are slaves. Greeneville college has been established by law in this county. (See GREENVILLE.) — Also, a county in the upper district of Georgia, bounded W. by the upper part of Ocmee river, E. by Wilkes county, and S. by that of Washington, containing 10761 inhabitants, including 3647 slaves. The chief town is Greenborough — Also, a county in the state of Ohio, bounded N. on the Indian ocean, S. on Rofs and Warren, E. on Rof and Franklin, and W. on Montgomery county. Its extent from N. to S. is 58, and from E. to W. 21 miles. By the census of 1803 it contains 446 white males of 21 years and upwards.— Also, a township in Chenango county, New York, on the E. side of Chenango river, containing 655 inhabitants.

GREENFIELD, a handsome flourishing poft-town in Hampshire county, Massachusetts, about 104 miles W. by N. from Boston. This township lies on the W. banks of the Connecticut river; it was incorporated in 1753, and contains 1254 inhabitants — Also, a post-town in Saratoga county, New York, containing 3673 inhabitants. — Also, a town in Hillsborough county, New Hampshire, containing 934 inhabitants.

GREENHILL, John, in Biography, a painter of much promise, but whose disolute morals cut short his thread of life, at the early age of 20. He was born at Salisbury in 1649, and became a pupil of Leiby, whose manner of course he imitated, and with much success.

GREENHOUSE, in Gardening, a house of shelter in a garden; contrived for preserving the more tender and curious exotic plants, which will not bear the winter's cold abroad in our climate. Greenhouses, as they are now built, serve not only as conservatories, but likewise as ornaments of gardens; being usually large and beautiful structures, in form of galleries, wherein the plants are handomely ranged in cases for the purpose.

The greenhouse is a sort of building, framed and covered with glazed frames, designed for the purpose of preserving various sorts of exotic shrubs, &c. through the winter season; the aid of artificial heat is not here necessary, except in very intense cold weather. It is advisable, in constructing such houses, to erect flats to life occasionally, which may prove irrevocable, not only in severe frosts, but also in mild foggy weather, where a moderate fire will now and then dry up the damps, which would otherwise prove pernicious to many of the tender kinds of plants.

It differs from the conservatory chiefly in this circumstance, that the plants, trees, or shrubs, are in pots or tubs, and placed upon stands, frameworks, ftrasses, during the winter, to be removed to proper situations in the open air, in the hot summer season; while in that there are built, borders,
diers, and clumps, laid out in the ground plan, and made up with the hell earthy materials, to the depth of three or four feet, in which the shrubs, trees, &c. are regularly planted; the whole of the roof being removed during the summer to admit fresh air, and replaced on the approach of the autumn, to remain until the following summer renders it unnecessary.

The green-houses are at present mostly contrived to stand in the pleasure-ground, near to the house, if possible. They should be upon a somewhat elevated spot, full to the south, and where the sun has access from its rising to its setting: these buildings are commonly of brick or stone, having the fronts and tops almost wholly of glass-work; and ranging lengthways east and west. They are generally constructed upon some ornamental plan. As to the general dimensions in respect to length, width, and height, they may be from ten to fifty feet, or more in length, according to the number of plants to be contained; and in width, from ten to fifteen to twenty feet; but for middling-houses, fifteen or eighteen feet is a sufficient width; and in height in the clear, nearly in proportion to the width.

The walls on the backs and ends, particularly the former, should be carried up two bricks thick; and if more than fifteen feet high, two bricks and a half thick; at one end of the back wall on the outside, it is eligible to erect a furnace for burning fires occasionally, communicating with flues within, ranging in two or three regions along the back wall, having one flue running along the front and end walls, raised wholly above the floor of the house.

The fronts of the buildings should have as much glass as possible, and wide glass doors should be made in the middle, both for ornament and entrance, and for moving in and out the plants. It would also be convenient to have a smaller entrance door at one end; the width of the windows for the glass sash may be five or six feet; and the piers between the sashes may be either of timber, fixed, the, or ten, or inches wide, according to their height, or if of brick or stone-work, two feet wide at least, sloping both sides of each pier inward, but from taking off the angles, a free admission may be given to the rays of the sun. For the same reason, the bottoms of the sashes should reach within a foot of the floor of the house, and their tops almost as high as the roof; and if brick or stone piers two feet wide, flutters may be hung on the inside to fall back against each pier. The roof may be either wholly or only half glass-work, next the front; the other half, flat, or only half that of the two, or front piers are of timber; and the flutters to the top of the glass may be so contrived as to slide under the flat roof; where the piers are of brick or stone, it is common to have the roof entirely flat or tiled; but slating the most ornamental for a half or whole roof; and the ceiling within should be white; which, as well as the whole inside wall, must be well plastered and white-washed, so as to render it clean and neat.

But in green-houses of modern construction, in order to have as much glass as possible in front, the piers between the sashes are commonly of timber only, from six to eight to ten inches thick, according to the height, so as to admit as great a portion of light and heat of the sun as possible, and the roofs wholly of glazed frame-work.

The green-houses for large collections of plants have sometimes two wings of smaller dimensions, added to the main buildings, at each end, in a right line, separated sometimes from it by a glass partition, with sliding sashes for communication, and the front almost wholly of glass-work, and half or whole glass roofs. Thus, by these additional wings, the houses confit of three divisions, whereby the different qualities and temperatures of the various plants can be more easily fitted. The middle, or main division, may be for all the principal and more hardy, woody, or shrubby kinds, which require protection only from frost; one of the wings appropriated for the succulent tribe, and the other to the more tender kinds that require occasional heat in winter, but which can live without the heat of an office or hot-house.

On whatever plans green-houses are constructed, the whole of the inside walls should be neatly smitten off with plaster and white-wash, and the wood-work painted white; the bottom being painted with large square paving tiles, or some other similar material.

In the green-house there should be flanks, frames, or trellis, which may be moved in and out, upon which rows of planks may be fixed, so as to place the pots or tubs of plants, in regular rows, one above another; by which their heads may be so situated as to interfere with each other; the lowest rows of plants next the windows being placed above four feet from them, that there may be convenient breadth left to walk in front; and the rows of plants should rise gradually from the fire, in such a manner, that the heads of the second row be entirely advanced above the first, the items only being hid; and at the back of the house, a space allowed of at least five feet, for the convenience of watering the plants, and to admit a current of air around them, that the damp occasioned by their perspiration, may be the better dissipated; which by being pent in too closely often occasion a mouldiness upon the tender shoots and leaves, and, when the house is close shut up, this flattering, rainy vapour is often very destructive; for which reason they should never be crowded too close to each other, nor should succulent plants ever be placed among them.

In Plate Gardening, (Green-house) there is a ground plan and elevation of an improved green-house in which fig. 1. shows the front elevation, fig. 2. the ground plan, and fig. 3. a section of the same.

And at fig. 4. is another house of this kind upon another plan.

Green-house Plants, in Gardening, are such as require the protection of this sort of building during the winter or other season; the following are the principal of the different sorts that demand this kind of treatment.

Succulent Kind.

Agave, agave or American aloe; comprising common great American agave, with entire green leaves, and a branching flower-spike;—common agave with striped leaves;—Virginian agave, with narrower pale-green leaves.

Aloe, African aloe; containing mitre-shaped aloe-tree, or fword aloe,—aloë ferox,—fan aloe;—lococotine aloe;—foap aloe;—partridge-breast aloe;—tongue aloe;—warted-tongue aloe;—pearl-tongue aloe;—cobweb-aloe;—hedgehog aloe;—cushion aloe;—spiral aloe;—pentagonal spiral aloe;—triangular spiral aloe;—iris uvaria aloe.

Anthericum, spider-wort; containing shrubby flowered, onion-leaved anthericum;—aloë-leaved anthericum;—mock alphodel anthericum.

Calceus, foreign calex;—containing callosa floccid;—Kleina or Indian calceus;—anteumorphium calceus;—papillary calceus.

Cactus, melon-thistle; containing cactus opuntia, or common Indian fig.

Caydenon, navel-wort; containing round-leaved, long-leaved, hemispherical-leaved navel-wort.

Crassula, liver orpine; containing several species. Lophoria.
GREN-HOUSE PLANTS.

Euphorbia, euphorbium; containing most of the foids.
Myriophyllum, fig marigold; containing many curious
fpecies.
Sempervivum, tree-ever, or base-leek; containing tree-base
leek;—variegated tree-base-leek;—leifer canary tree-
base-leek.

Herbaceous Kind.
Anthology, Ethiopian corn-flag; containing ringent scarlet
anthology;—Ethiopian crimson antholyza;—cunonia, or
large lipped scarlet-flowered.
Antirrhinum, snap-dragon; containing variegated snap-dra-
gon;—Gibraltar spotted flowered linaria;—Dalmatian toe
flax.
Arifloehia, birthwort; containing evergreen arifloehia;
—pifloehia, or small birth-wort.
Bryonia, bryony; containing African tuberous-rooted
bryony.
Calia, calia; containing sweet calia, or Ethiopian
arum.
Campanula, bell-flower; containing American bell-flower.
Canaria, canaria; containing canary bell-flower.
Canna, Indian flowering reed; containing common Indian
flowering reed, and varieties;—glaucescent Indian reed.
Crinum, afphodel lily; containing African afphodel lily;
—broad-leaved afphodel lily.
Cyclamen, cyclamen; containing Perian cyclamen, and
several varieties.
Erodium, erodium; containing pentandrous geranium or
crane’s bill;—thick-leaved erodium;—upright dwarf erodi-
um.
Brythra, coral-tulip; containing herbaceous erythrina.
Ixia, ixiia; containing African weedy-headed ixia;—bulbi-
erous ixia;—flexuous ixiia;—corymbous spotted-flowered
ixia.
Leonurus, leon’s-tail; containing African scarlet leonurus;
—striped-leaved leonurus.
Ornithogalum, flar of Bethlehem; containing Cape ornitho-
galum.
Trapaolum, Indian creft; containing double Indian creft,
or natturtium.

Shrubby Kind.
Andromeda, andromeda; containing tree andromeda, or
Carolina forrel.
Anthophyllum, amber-tree; containing Ethiopian smooth
amber-tree;—ciliated amber-tree.
Antibasis, Jupiter’s beard, or barba Jovis;—common barba
jovis, or silver bunt;—Spanish ternate-leaved barba jovis;—
dwarf Portugaue barba jovis;—ceramace, or prickly an-
thyllis.
Arctitis, arctitis; containing rough-leaved arctitis;—
narrow-leaved arctitis;—sea rag-wort leaved arctitis;—
plantain-leaved arctitis.
Arrtenia, mugwort;—containing tree wormwood.
Asphaltilia, swallow-wort; containing shrub asphaltilia.
Asparagus; comprising white prickly asparagus;—deci-
nated bristly-leaved asparagus;—acute-leaved asparagus;—
retrofacted great prickly asparagus.
Asfer, flar-wort; containing shrubby African alter.
Asfragalis, milk-seatb, &c;—comprising the tragacanth, or
goat’s-thorn, and several varieties.
Atropa, deadly night-flinte; containing shrubby deadly
night-shade of Spain.
Baccharis, ploughman’s spike-ned; containing ivy-leaved,
baccharis;—olander-leaved baccharis;—halimus-leaved
baccharis.
Bofea, y ru-mor;—or shrubby golden-rod tree.
Bromia, bromia; containing knob-flowered, or imbricated-
leaved, woolly-heath leaved abrotanoides, or thyme-leaved
radiated bromia.
Bubon, Macedonion pasley; containing shrubby galban-
iferous bubon;—shrubby gummiferous bubon.
Buddleia, buddleia; comprising American long-spike, oc-
cidental American, globular-headed buddleia.
Buphthalmum, ox-eye; containing shrubby Jamaica ox-eye;
—maritime, or sea ox-eye.
Bupleurum, hare’s ear; containing shrubby Aethiopian
hare’s ear;—shrubby duftrm-leaved Cape hare’s ear.
Calendula, marigold; containing shrubby Cape marigold;
—shrubby grafs-leaved Aethiopian marigold.
Cepora, capper-bush; containing fomious capparis, or
tree capper shrub.
Callian, callian; containing Cape phillyrea;—Mausweema,
or Hotentot cherry.
Canthus, canthus; containing African canthus.
Celastrus, sleet-tree; containing pyracantha-leaved cela-
trus;—box-leaved;—myrtle-leaved celtatrus.
Ceratonia, carob-tree; comprising common eabro-tree, or
St. John’s beard.
Clammea, clammea; containing dwarf palm.
Chrysanthemum, chrysanthenum; containing shrubby canary
chrysanthenum;—shrubby floccular chrysanthenum.
Chryzoa, golden-leaves;—containing shrubby coma aurae,
or greater African golden-leaves;—shrubby nodding gold-
locks.
Ciftus, ciftus; containing bay-leaved ciftus;—sea purflane-
leaved ciftus;—and several other species.
Citrus, citron-tree; containing lemon-tree, and orange,
with all the varieties of each.
Cliffortia, cliffortia; containing sea-leaved cliffortia.
Chelista, alaternside chelista; containing purflane-leaved
chelista;—alateria or Indian clavelia.
Colocasia, colocasia; containing shrubby Aethiopian scarlet
colucata.
Convvolulus, convvolulus; comprising evergreen canary
convvolulus;—silverly convvolulus.
Coronilla, coronilla; containing valentine coronilla;—
glaucus coronilla;—silverly coronilla.
Datis, datis; containing catinus-leaved datis.
Digitalis, fox glove; containing shrubby canary fox-
glove.
Diosma, African fjoria; containing opposite-leaved, hairy-
leaved, red diosma, &c.
Ebenus, eby; containing eby of Crete.
Empita, broom; containing shrubby eban broom.
Geranium, geranium; containing all the shrubby kinds.
Gendonia, gendonia; containing lobolly bay.
Gerertia, gerertia; containing shrubby prickly-leaved
gerertia.
Grewia, grewia; containing occidental grewia.
Halleria, halleria; containing African-fly honeyfickle.
Heliotropium, turn-satle; containing shrubby Peruvian helio-
tropium.
Hermannia, hermannia; containing althea-leaved, alder-
leaved, lavender-leaved, goof-tree-leaved hermannia.
Hypericum, St. John’s wort; containing warted-leaved.
Minorca St. John’s wort;—Carolina St. John’s wort;—
China monogynous St. John’s wort.
Jasminum, Jasminum; containing Catalonian jasmine;—
African jasmine;—yellow Indian jasmine.
H P Y H E M , candy-tuft;—evergreen tree candy-tuft;—ever-green
striped-leaved candy-tuft;—ever-flowering tree candy-tuft.
Jupiter, Malabar nut-tree.

Santana,
GREEN-HOUSE PLANTS.


Laurus, bay-tree; containing Carolina blue-berry bay—red-berryed bay-tree—Indian bay-tree—cinnamon-tree—campire-tree—deciduous bay-tree.

lobelia, lobelia; containing shrubby, pine-leaved, blue lobelia.

Lycium, box-thorn; containing African box-thorn—Barbary box-thorn.

Malva, mallow; containing African shrub-mallow medicago—shrubby hoary medicago, or moon trefoil.

Melia, melia; containing the bead-tree.

Menisus, mint; containing tree-mint.

Morus, morus; containing calcinated-leaved moria—ruit-leaved moria.

Myrica, gall, sweet-mallow, and common berry myrtle; containing oak-leaved myrica—Ethiopian heart-leaved myrica.

Myrtus, myrtle-tree; containing common myrtle, which comprises many varieties.

Nerium, oleander, or rose-bay; comprising common oleander, with red flowers, scarlet flowers, white flowers, double flowers, rippled-leaved.

Olea, olive tree; containing European olive tree—Cape or African olive tree.

Ononis, rift barrow; shrubby Spanish ononis.

Oleaster, olearia; containing hard-leaved chrysantheme.

Othamna, ragwort; containing pectinated-leaved othamna—southernwood-leaved othamna.

Paeonia, floury-wort; shrubby African paeonia.

Pelargonium, African geranium; containing many shrubby species.

Pheumus, Jeraphon faze; containing yellow phlomis, and varieties—purple phlomis.

Phyllis, phyllis; containing alkekengi, or winter cherry—fomiferous winter cherry—flexuous winter cherry.

Pistacia, Pistacia mut, and mastic tree; two or three varieties.

Polycarpa, milk-wort; containing shrubby myrtle-leaved polycarpa.

Portulaca, portulaca; containing shrubby Cape portulaca tree.

Potomitan, burnet; containing shrubby prickly burnet.

Prasium, frutibx hedge wattle.

Protea, floury-tree; containing common silverly protea, or changing tree—coniferous protea.

Punica, pomegranate tree; containing dwarf pomegranate.

Rhus, fumich; containing African hoary fumich, and varieties—African narrow-leaved fumich, and varieties—flaming-leaved African fumich.

Regula, regula; containing African bladder-mut.

Rhamnus, dock; containing  tormentor dock.

Rutacea, kale-bolly; containing Alexandrian laurel—tongue-upon-tongue laurel.


Secubia, secubia; containing shrubby lecythus.

Senecio, groundfet; containing shrubby African groundfet.

Sideraulis, iron-wort; containing Canary iron-wort—Cretan iron-wort.

Soluranum, night-shade; containing amomum Plinii—baftard capuchin, or winter cherry—African jagged-leaved soluranum, or pomum amoris—American twin-fruited soluranum—thorny, downy night-shade.

Tinactum, tanfey; containing shrubby Aethiopian tanfey—under-shrubby lampa-leafed tanfey—tree tanfey.

Tarakbanus, tarakbanus; containing shrubby African fleabane.

Tetragoneia, tetragoneia; containing shrubby tetragoneia.

Tecuinion, germander; comprising Spanish tree-germander—broad-leaved tree-germander.

Vites, chestnut-tree; containing evergreen chestnut-tree.

Ulex, furze or alder; containing African berry-bearing furze.

Xranthemum, xenanthemum; containing broad-leaved xranthemum—narrow-leaved xranthemum—trailing xranthemum.

Yucca, Adam's needle; containing common Adam's needle—threaded-leaved Adam's needle—sloe-leaved yucca—dragon tree-leaved yucca.

Zygophyllum, bean caper; containing xelile-leaved bean caper—purfane-leaved been caper.

Under-shrubby Kind.

Dracocephalum, dracocephalum; containing Canary dracocephalum, or balm of Gilead.

Gnaphalium, gnaphalium; containing oriental gnaphalium, and varieties—sweet-scented gnaphalium.

Indura, inula.

Kegelaria, kegelaria; containing African kegelaria.

Lavatera, lavatera; containing Cape lavatera.

Lovendula, lavendula; containing cat-leaved Canary lavender.

Lotus, bird's-foot trefoil; containing Cretan silverly lotus—lotus Jacobus—upright lotus.

Mediola, mediola; containing climbing African mediola.

Organum, organy; containing dittany of Crete—dittany of mountain Sipylus—Cretan marjoram—organy of Smyrna.

Periploca, Virginian flax; containing African hoary-climbing periploca, and varieties.

Phyllis, baflard alaternus; containing box-leaved phyllica—health-leaved phyllica.

Phyllis, baflard hare's ear; or simpla nobla.

Polium, or mountain poli; containing marum, or Syrian malich.

Rhynnum, buckthorn; containing broad-leaved Indian rhynnum—zizyphus, or jujube.

Selagia, flaga; containing coremb flago.

Smilax, rough bind-weed; containing Chinese rough bind-weed, or China-root—laurel-leaved rough bind-weed, and several varieties of each.

Stabe, flabe; containing bashard elchrysum.

It may be observed, that these sorts of plants must constantly be kept in pots, and some large kinds in tubs, for moving into shelter in winter, and into the open air in summer; as, being all exotics from various warm parts of the world, they are of tender growth in this climate, and consequently not able to live in the open air in the winter months.

And the pots and tubs for containing them must be of different sizes, according to the size and nature of the plants, which, as they advance in growth, should have large pots, &c. provided for them accordingly; and when they become wholly too large for the pots, they must be shifted into tubs hooped with iron, with two iron handles to each at the top-part.

It is necessary in potting or planting the different sorts, care should be taken that the pots or tubs have holes at bottom for the discharge of redundant moisture, each hole bring.
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being covered with a piece of tile or oyster-shell before the mould is put in, to prevent their being flopped up, and the earth from being washed out below.

The best modes of propagating the different sorts, the nature of the earth in which they succeed best, and the season most proper for raising them, are fully explained under the cultivation of the respective kinds, and may be seen under their proper heads.

General Method of Management of Green-house Plants.—As most plants of this sort are capable of bearing the open air from the latter end of May till October; but the rest of the year demand the protection of the green-house, they, of course, require to be set out into it as soon as the weather begins to be suitable, in the spring and summer months: especially for such as all the several varieties of myrtles, geraniums, oleanders, cistuses, phloxines, shrubby alyssum, tree-wormwood, tree-candy-tuft, yellow Indian and Spanish jasmine, Indian bay, &c &c. And this should be done in the latter week in May, or first in June, according as the season proves more or less favourable for all the sorts; but it should not be attempted till the season is become perfectly settled, and there is a fair prospect of summer being arrived, as there are often very cold nights and frequently frosty mornings in May, and even in the beginning of June, which, if the plants were fully exposed, would pinch the ends of their young shoots and leaves, and greatly injure them. A mild warm day should be chosen for this work; and if a warm rain, it will be of much advantage, as it washes the leaves and branches from the dust they have contracted, and greatly refreshes the plants that are thus exposed to it.

Method of Setting out the Plants.—This is done in the more hardy sorts in thin pots about the middle of May.

When first brought out, it is proper to place them in some sheltered sunny place, for a fortnight, till they are inoculated to the open air; then to set them in any open exposure, where they are to remain for the summer. And as soon as they are brought out, they should be cleared from all dead leaves, and all dead wood; and the earth on the surface of the pots be stirred, taking a little of the old out, and adding some fresh mould in its stead, which will prove very beneficial; then give moderate watering, not only to the mould, but also over the heads of the plants, to make them effectually from all dirt and litter which they have contracted in the green-house during the winter.

In putting them out, they may be placed according to the fancy of the proprietor; four of the handomest plants being occasionally placed to adorn spacious fore-courts, or arranged on each side of large walks contiguous to the main habitations; and others near ornamental garden-buildings, they are also sometimes diversified in groups, or small clumps in the most conspicuous places, in different parts of the pleasure-ground; exhibiting different sorts in each group, in order to cause the greater variety and effect in such situations.

As soon as they have been thus placed out, their chief culture is, to supply them plentifully with water during the summer season, in hot dry weather: all the woody or shrubby kinds in particular; likewise the herbaceous kinds that are not very succulent, require it three times a week at least; and in a very hot dry weather every day. The succulent kinds must also have a moderate supply of water two or three times a week in dry weather; the proper time for watering all the sorts at this season is, either in the morning before nine o'clock, or in the afternoon at four or five; for, if performed in the middle of the day in summer weather, the sun would exhale a great part of the moisture before it effected its intended operation on the fibres of the plants; this bulk

nfs should be duly attended to in dry weather. As the mould roots, and fibres of the plants are circumcised within the narrow limits of a pot or tub, the earth, as well as the fibres, dries very fast in summer, and necessarily requires frequent refreshments of water, to preserve that degree of moisture which is requisite for the support of healthy vegetation in the different plants.

Even moderate rains should not prevent watering occasionally, especially such plants as have spreading heads, which prevent the rains, unless very heavy or continual, from falling in sufficient quantities on the earth of the pots, to moisten it properly. And in hot weather, if some mowing of short herbs are spread on the surface of the orange-tree tubs and others, it will greatly preserve the moisture. During this season, it will also be a good practice to loosen the surface of the earth now and then in such pots and tubs as have a tendency to bind or become stiff by time.

Manner of taking in the plants.—About the beginning of the autumn, as towards the latter end of September, the more tender kinds of these exotic plants must be removed into the hothouse; the succulent tribe, in particular, should be removed to shelter at the first approach of excessive wet and cold nights. The oranges, lemons, and all the other species should be moved into shelter in due time, either in the end of September or early in October; for, if they are permitted to remain in the open air till attacked by sharp weather, it changes the beautiful verdure of their leaves to a rufy yellow hue, which do not recover during winter; therefore, about the latter end of September, or beginning of October at least, the principal plants should be brought in; the succulent and others of a more tender temperature, as early in the former month as the cold weather begins to come on; and continue moving in all the others as the cold increases; and by the middle of October have the whole collection in the hothouse. As the time approaches for moving in the different sorts, clear them perfectly well from decayed leaves, &c. all the pots being well cleaned, loofening the surface of the earth in each pot, and adding a little fresh mould. As the different sorts are brought occasionally into the green-house, they may be placed promiscuously till the whole are in, and then be arranged regularly, as they are to remain for the winter; leaving all the windows quite open till that time. When the whole is brought in, they should be diffused in regular order, so as to appear to the belt advantage, both in respect to their general arrangement and variety; and for as each may have an equal portion of fun and air; the tallest plants being arranged in the back, the others in their several ranks, according to their degrees of height, gradually down to the lowest in front; and as there is a vast variety both in size, shape, and colour, of the foliage, they should be diffused so as to set off each other and give a pleasing variety to the whole; and if possible, they should stand clear of one another; by which each plant will be separately conspicuous, and the whole exhibit a greater air of freedom and variety, as well as admit an equal portion of fun, and a more free circulation of air among them.

When the plants have been thus collected in, their principal culture is the supplying them with fresh air at all opportunities in mild weather, and giving moderate waterings occasionally, picking off decayed leaves, cutting out canals decayed shoots, and making occasional moderate fires in fever weather, also, sometimes to diffuse great damps and noxious fogs from them.

With respect to giving air, it should be admitted every mild, calm day, by opening the windows more or less, according to the temperature of the weather. When the plants are
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are first housed, they should have as much free air as the nature of the season will admit, by opening the windows every mild day to their full extent; and if the air is quite temperate, they may remain open in the nights for the first week; but in cold nights they should be constantly shut; this work of admitting air must be constantly attended to all the winter; for, without a due portion of this essential article in mild weather, the plants soon lose their fine verdure and assume a sickly yellowish colour, become discoloured, and the young shoots, in many sorts, grow mouldy and rot off, and the leaves of the plants drop; therefore, never omit every mild day, when not very damp or foggy, to open one or all of the windows little or much, according as the air is more or less temperate; the proper time during winter for this, is from about eight, nine, or ten in the morning, till three, four, or five in the evening, according to the mildness of the day; but as the days lengthen and the warm weather increases, give more air in proportion, earlier and later in the day as may be judged proper, being careful always to shut all close in due time every evening, as soon as the sharp air approaches. In foggy weather, it is advisable to keep the windows quite close; for the great damp occasioned by fogs are very pernicious to these plants whilst they are confined in the houfe; also, when hoarice or cold cutting winds blow towards the front of the greenhouse, the whole should be kept shut; or only, if thought necessary, some of the upper glasses drawn down a little way at top, above the reach of the wind rushing immediately upon the plants, likewise, in all frosty weather, the house should be kept close, except the frost is moderate, and the middle of the day sunny and warm, when some of the windows may be opened a little, but shut close again if the sun is clouded, and at any rate before the air changes cold; in severe weather, the shutters, &c. should be shut every night, also, occasionally when the frost is extremely rigorous and no sun; and likewise, in such weather, the allowance of fire-heat as hereafter directed may be necessary. As the spring approaches, and the weather grows warmer, enlarge the portion of air accordingly; admitting it also both earlier in the morning and later in the evening as the days lengthen; for then the plants will assume a growing state, and a considerable portion of air is requisite every mild day, both to strengthen the new shoots and insure the plants by degrees to the air against the time for removing them fully into it again for the summer season.

And watering will also be necessary to most of the sorts, but must be afforded them as sparingly as possible during the winter months, and fearfully any should be given when the house is obliged to be shut close through the severity of the weather; there are no certain rules to be given for the application of this; some plants require only a little water once a week, or ten or twelve days in mild weather, such as the orange and lemon trees, myrtles, oleanders, shrubby geraniums, and other woody sorts; all that is necessary being just to preserve the earth very moderately moist; the pots and tubs must therefore be examined with proper attention, and water given to such only as are in want. The herbaceous kinds should be rather more sparingly watered than the shrubby sorts; and all the succulent tribe have water but seldom, some not oftener than once a fortnight or three weeks, and that always but very sparingly at each time; and some that are very succulent require but very little from November till March; indeed all the succulents should only have it now and then at this season, when the earth in the pots becomes very dry and hard.

In executing the business of watering in general, care should be particularly taken to do it with great moderation at the time the plants are in the greenhouse, as when once over-wet the earth at this season, it will continue in that state for a long time, and by chilling the tender fibres of the roots of the plants, often caufl the loss of the leaves of many of them, and even the death of some kinds. In a funny day, from about eleven o'clock to two, is the most proper time for having this sort of work done.

Soft water, if possible, should be used, or at least such as had been exposed to the air two or three days, as fresh spring water is much too cold; and during frothy weather great attention is requisite to keep all the windows close, night and day, unless when very moderate, as just observed, and the middle of the day is sunny and warm; when some part of the house may be opened a little for two or three hours, having particular regard to shutting all close in dark time in the afternoon, before the airs change to become sharply cold; but in very severe frosts it must be kept close night and day, and the shutters or other covers of canvass or mats be also used every night; also, occasionally in the day time, when the weather is intensely severe, and no sun appears, and there are no flues for fires to keep out the frost. The shutters, or other shelters, besides the glasses, should however be used as little as possible in the day-time, except in cases of particular necessity, as every opportunity ought to be taken for the admission of light and fresh air, as much as the temperature of the weather will permitly permit, as most of the plants only want protection from frost and the common shelter of the house, which, with shutting the fash clofe every night, will be sufficient for the purpose.

In cases where there are flues for fires, it will be admissible to make moderate ones at such times as the frost cannot be otherwise kept out, especially on nights; but this must by no means be continued longer than is necessary to guard against very severe frosts and the danger of the plants.

In very cold, foggy, damp weather, a moderate fire is now and then in the flues also proves very beneficial in expelling the damp unwholesome vapours, so pernicious to all plants of this nature. Whilst the plants are in the houfe, all decayed leaves, &c. should likewise be constantly picked off, being necessary both to preserve the beauty and health of the plants. The decayed leaves of the succulent kinds should be cut off close with a sharp knife; the plants in general should likewise be occasionally cleaned from any filth they may contract in the house, such as dust, cobwebs, &c.

General Method of Culture of the Plants.—These sorts of plants generally want shifting into larger pots and fresh earth as they advance in growth; such as are fall growers, as some of the shrubby geraniums, &c. annually, or every other year; and some plants in large pots, &c. once in two or three years, and others not so often, especially some large grown American aloes, orange and lemon-trees, and those in large tubs, having a considerable substance of earth about the roots. Sometimes these and other similar kinds, when not convenient to shift them, have the top earth, and a little down round the sides, loosened to some moderate depth in the spring, removing the loosened soil, and filling the space up with fresh compost. But as the plants in general increase considerably in proportion to their nature of growth, shifting into larger pots or tubs, with some fresh earth, should not be omitted occasionally as it may seem necessary, as it proves beneficial to most of the sorts. They may molt of them be shifted with the ball of earth about their roots entire; but others, that are weak and loply, require shifting into entire fresh earth prepared for the purpose.

The most proper time for shifting all the sorts is in April,
or before they are removed into the open air for the summer; but it may be occasionally done in autumn, as in August or the beginning of September, in time to strike fresh roots before winter. In the work of shifting, each plant should be drawn out of its pot or tub with the ball of earth about its roots entire, then all the dry-matted fibres round the outside of the ball pared off and cleared away, also, some of the old earth at the sides, bottoms, and tops: then having the new pots and fresh earth ready, the holes at the bottoms of the pots should be covered with pieces of tiles or oyster-shells, and some of the fresh earth put in; placing the plant in the pot, and filling up the vacancy all round with more fresh compost, bringing it an inch over the top of the ball, giving a good watering to settle the earth clods in every part: after this, it is necessary to place the plants to have shade from the mid-day sun for a week or fortnight, and sometimes longer.

All such plants as are become of a weak sickly nature should, at shifting, have all the earth taken clean from about their roots, having them washed, and then planted into entire fresh earth properly prepared for them.

And the larger sorts of plants, such as the orange-trees, lemons, citrons, American aches, and others of similar growth, should be shifted, when large, from pots into tubs hooped with iron, having two iron handles at top, as observed above, for the convenience of lifting them in and out of the greenhouse, as they sometimes grow to so large a size as to require two and sometimes three or four men to move them. But all such plants as are not shifted annually should, in spring, have the earth in the tops of the pots or tubs hooped to a little depth, also, a little way down round the fibres, taking the loofened earth out; and in its stead adding a quantity of fresh mould, giving it directly a little water to settle it clods. This should never be omitted when necessary. At any time when the surface of the earth is observed to be stiff, whether in the shifted or unshifted plants, it is of much service to stir it an inch in depth occasionally, and add a little fresh compost when necessary to the plants.

And the mould or compost into which the plants are to be shifted is of considerable importance. The best is obtained from commons where sheep and cattle pasture, particularly in low places, where the finest grass grows and the soil is deep. A foot of the top soil with the turf should be taken off, and, if a sandy or hazel loam, it will do alone; but if a strong loam, some sand and black peaty, boggy, or moorish soil should be added. Such soils should be laid in a heap fix winter months or more, and frequently turned over. Some plants, such as aloes, cacti, melichrysum, anthemists, ixias, and exotic hothouse plants in general, require a soil which is a degree lighter, and which does not retain the water, but lets it pass readily. A little coalashes at the bottom of each pot is useful in this view as well as others.

Most of the ericas, or heaths, and other beautiful plants from the Cape of Good Hope, from America, and Botany Bay, delight and flourish in this sort of earth, which comes nearest to their native soil: thus, the heaths like a black peat or moorish soil; and the others, that which is made a degree stronger, with loamy earth intermixed with it.

It is necessary to keep the heads and every part clean from dust and other filth, by occasionally washing with water all the forts, which in moist is done by waterings over their heads; but in others, when very foul, by washing their leaves with a sponge and water, especially in winter.

This is often necessary to the oranges and lemons, and other large-leafed kinds of plants that have been mentioned.

Where the heads of any of the thrubby kinds are become very irregular or flabby, the branches may be pruned shorter or longer, as necessary, in the early spring months.

And where any of the principal exotics assume a declining state, such as oranges, lemons, &c. or have thin, thrashing, weakly heads, or are apt to drop their leaves, it is proper either to shift them wholly, or apply some fresh earth to their roots, and then prune the heads moderately close in the early spring, plunging them in a bark-pit under glasses. The heat of the dark-bed greatly revives their growth, that they break forth into many strong new shoots, and form handsome renewed full heads in the summer fedon.

While in the greenhouse, some plants drop all their leaves, either by the effects of cold or over-watering, or sometimes by being kept too long in too dry a place, as frequently occurs in myrtles and geraniums, and sometimes oranges, lemons, and others; in which case it is proper in the spring to prune the heads, shortening the long strong shoots and branches and to shift them with balls into fresh earth, or, if not shifted, to loosen the earth in the tops and sides of the pots, drawing out the loofened mould, and suppling the place with fresh. They afterwards soon push forth into young shoots and leaves, and renew their heads with verdure. Sometimes myrtles, geraniums, &c. in this state, when headed, may, on being brought forth in the summer, be drawn out of the pots, and plunged in the ground in a sheltered situation, and watered in dry weather; when they will send their roots into the full earth and break forth strongly at top into young wood and foliage, and form full heads, being then re-potted with balls of earth to the roots.

But the heads of green-house plants should never be clipped with garden-scissors, nor, by any mode of pruning, trimmed into any formal figure, as sometimes practised; but every fort be let assume its own natural growth, only just using the knife to regulate any very irregular or rambling shoot or branch, or to trim out some where too much crowded, and to cut out the dead wood they may contain in any part of them.

GREENLAND, in Geography, comprehends a peninsula generally allowed to be attached to North America, and a number of detached islands, situated in high northern latitudes; the former is called West or Old Greenland, and the latter East or New Greenland, and more commonly Spitzbergen.

West or Old Greenland, is now generally believed to be a peninsula, connected in its north-western parts, hitherto unexplored, with America. The reason alleged for supposing that the N.W. side is contiguous to America, and actually attached to it are the following: Davis's Strait, or Baffin's bay, it is said, becomes narrower and narrower towards 78° N. lat.; the coast also, which in other places is very high towards the sea, gradually lowers northward; and the tides, which at Staten Hook, and even as far as Cockin's found, in the 65th degree, rises 18 feet at the new and full moon, descends so much in the north above Disko, that in the 75th degree it does not rise much above eight feet, and probably loses itself entirely at lat. Hence captain Baffin gave up all hopes of finding a passage into the South seas through Davis's straits, and consequently concluded, that Greenland joined with America. The Greenlanders report, though much dependence cannot be laid upon their information, that the strait at lat. becomes so narrow, that they can approach the other side so nearly, as to be able to call to the inhabitants, and strike a fish from
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from both sides at once: but they affirm, that a strong current runs from the north into the strait, which prevents their coming to one another.

The name Greenland was given to the eait side of this territory many hundreds years ago by the Norwegians and Icelanders, who are said to have first discovered it, because its appearance was greater than that of Iceland. But this east side, sometimes called Old or Left Greenland, is now almost totally unknown, because ships cannot navigate this coast, on account of the great quantities of floating ice. West Greenland lies between the straits of Davis and Prohibition, and Iceland, and is bounded on the W. by Baffin's bay, on the S. by Davis's strait, and on the E. by the northern part of the Atlantic ocean; but its northern boundaries are unknown. It reaches from the southermost point of Cape Farewell, and Staten- hook, in the 55th degree, on the right side north-eaftward, towards Snaizbergen, to the 80th degree; and on the left side opposite to North America, N. W. and N. till about the 78th degree; the coasts having been so far discovered. Most of the Greenlanders live from Statenhook to the 62d degree, or, as the inhabitants say, in the south; but as no Europeans live there, these parts are imperfectly known. The interior of this dreary country is extremely mountainous, and some of the mountains are so high that they may be discerned at the distance of 40 or 50 leagues. This is particularly the case with that which is the highest mountain in the country, called "Horte-tak," or flag's-horn. It has three branches or points, the most lofty of which serves as a sea-mark to navigators, and also as a weather-gage, for when a horn is approaching from the south, the summit of this mountain is enveloped in a small misty cloud. The hills and rocks of this country are covered with perpetual snow; though the low lands on the sea-coast are clothed with verdure in the summer season. The ice and snow, like the glaciers of Switzerland, fill the elevated plains, and even many valleys. The coast is indented with many bays and clefts which extend far into the land; and it is encompassed with innumerable large and small islands, and both visible and imperceptible rocks. The shore, however, is in many places inaccessible on account of the floating mountains of ice. This country is said to have been discovered by some emigrants from Iceland: the distance, according to the best maps, being about 8° of longitude, in lat. 66°, or nearly 200 geographical miles, though some maps reduce it to 5°, or not more than 150 geographical miles. The discovery was accidentally made by Eric Raude, or the red-headed, who being exiled from Iceland on account of the murder of one of his chiefs, found this country; and, coasting along the S. W. border, wintered at an agreeable island near a found, which he called Eric's found. Having in the following year examined the main land, he returned in the third year to Iceland; and in order to induce the inhabitants of Iceland to accompany him he called it Greenland, expressing its verdant appearance, and represented it as abounding with pasturage, wood, and fish. The effect of his representation was such, that in the succeeding year he was followed by twenty-five ships full of colonists, who had furnished themselves richly with house- hold goods and cattle of all sorts; however, only fourteen of these ships arrived safe: but in process of time more colonies flocked to Greenland, both on the east and west side, from Norway as well as Iceland. Torfæus, a native of Iceland, in his "Greenlandia Antiquia," dates the discovery of Greenland in the year 822. But it has been inferred from a bull united by pope Gregory IV. in 855, commits the conversion of the northern nations, and in express words, of the Icelanders and Greenlanders, to the first northern apostle Ansgarius, (if this bull be indeed authentic,) that Greenland must have been discovered and planted about the year 830, by the Icelanders and Norwegians. Leif, the son of Eric Raude, is said to have made a voyage to Norway, A. D. 999, to give the king, Olaf Tryggefon, an account of the new colony in Greenland; and this king, having first renounced heathenism, converted Leif, and perfused him to be baptized, and to take with him to Greenland a priest, for the conversion of the inhabitants. Upon his return his father was induced to embrace Christianity, and the rest of the colony followed his example. In the year 1052 they chose Arnold, a Norwegian, for their bishop; and he fixed his episcopal residence at Greenland. In the year 1261, they, and the Icelanders, forsook themselves voluntarily under the Norwegian sceptre; and from that time they were governed by a king's deputy from Norway, according to the laws of Iceland; and when an archbishopric was erected at Drontheim in Norway, the Greenland bishops became suffragans to this metropolitan. The intercourse between this colony in Greenland and Norway continued, with little interruption, till the beginning of the 15th century: the last of 17 bishops being appointed in the year 1406. During this period the Greenland trade is said to have been very considerable; and it is very probable that they exported a large quantity of fish, butter, cheese, fish, train, and pelts, chiefly by means of foreign ships; for though the Norwegian settlers in Greenland, upon their first establishment, failed in their own vessels from Iceland and Norway to this country, they afterwards very much neglected navigation. After the period above-mentioned Greenland seems to have been little regarded, and its intercourse with other countries almost wholly ceased. In order to account for this sudden change of condition, it should be considered, that the first settlers were very much harassed by the natives, who were a barbarous and savage people, and who resented, in their customs, garb, and appearance, the Eskuiaux found about Hudson's bay. These people were denounced "Skraelings," or "Kornalt," an appellation assumed by the Eskimoa. The Danish Chronicle, a work written in verse, and, indeed, of doubtful authority, though cited by Torfæus, informs us, that certain Armenians were first driven hither by a Norm, and that from hence they peopled Norway and America, and that many tribes were found in Greenland, who were governed by different chiefs. The Skraelings, it is supposed, and not without some degree of probability, first came to Greenland in the 14th century, not from the east out of Europe, but from the west out of North America. But their origin is traced to the N. E. regions of Great Tartary, between the Icsea (mare glacie) and Mungolia. They first came into Tartary, after the great dispersion of the nations, and were driven on further and further by impetuous or more potent nations that followed them, till at last they were compelled to withdraw into the remotest corner of Tartary near Kam- skatka, and from hence they migrated to America; extending themselves round the S. E. part of Hudson's bay, or through Canada as far as the North sea: and here, it is supposed, they were first found by the Norwegians in the 11th century. Dreadful and wifling to avoid the molestation which they suffered from the other Indians, these fugitives retreated northwards, till, probably, in the 14th century, they either crossed Davis's straits in their boats, from Cape Wulfingham, in the 66th degree, to the South-bay in Greenland, which can be scarcely 60 leagues wide; or else they went higher up by Baffin's bay, and, if came down on the parts where the Norwegians formerly had their habitations, first on the west side, and then by degrees round to the east. These Skraelings are supposed to have exterminated the Ice-}
of a similar nature were repeated, but no permanent advantage resulted from them.

At length, in the year 1724, a pious clergyman of Norway, Hans Egede, having long lamented the wretched condition of the Greenlanders, through the want of religious instruction, as well as a variety of worldly comforts, and having projected, from the year 1728, schemes for their relief, without effect, determined to relinquish his church preferment, and to make a voyage to Greenland, with a view of accomplishing his benevolent intentions. After having collected a capital of about 2000l., by various subscriptions, and obtained from the king an appointment of missionary, with the yearly salary of 60l., besides a present of 40l. towards his equipment, Mr. Egede placed himself at the head of a colony of 40 persons, and sailed for Greenland. Thee adventurers, having sailed Statenburch, encountered many dangers from storms and ice, happily landed at Ball’s river, N. lat. 64°, on an island near Kangek, which they called after the name of the ship in which they had sailed, "Haa-bat-Ox,” i. e. Hope island. They were hospitably received by the natives, and Mr. Egede took great pains, by his cordiality, attention, and by the familiarity with which he communicated to them religious instruction, to conciliate their friendly attachment. He also took great pains to acquaint himself with the language of the country, and to discover the best places for hunting and fishing, so as most effectually to serve the convenience of the colony. He made repeated attempts for exploring the eastern side of the country, and for discovering Frobisher’s straits, but the wind and ice rendered his efforts unsuccessful. As a missionary, he discharged the truth which he had undertaken with singular fidelity, diligence, and zeal, and having continued in this indefatigable region till the year 1736, he returned to Denmark with a debilitated constitution. He was soon after appointed superintendent of the mission in Greenland, with a salary of 100l. per annum, and was ordered to found a seminary of students and orphans, whom he was to instruct in the Greenland language, and who were to supply a succession of missionaries and catechists. He spent his latter years in a retreat with his daughter, on the island of Falster, and there closed his life of service and honour, November 5th, 1758, in the 73d year of his age. To him and to his son, Paul Egede, we are indebted for the most ample and authentic account of modern Greenland. The example of Mr. Egede has been finely followed by several missionaries, particularly from among the Moravians, whose principal settlements were at Kangek, New Herrnhuth, and Lichtensfeld. From Mr. Egede we learn that the most practicable method of reaching the eastern part of Greenland will be to coast north about in small vessels, between the great flakes of ice and the shore; the Greenlanders having always declared, that the currents, which rush from the bays and inlets, and run south-westward along the shore, hinder the ice from adhering to the land, so that there is always a channel open, through which vessels of small burden may pass, especially if lodges were built at convenient distances on the shore, for the accommodation and direction of the adventurers. The part of the country that is now visited by the Danes and Norwegians, lies between the 64th and 68th degrees of N. latitude, and so far the climate is found to be temperate. We are told, however, that the country is inhabited as far as 76°; but the Danishes and Moravian settlements are chiefly in the south-west, though at one time there appears to have been a factory as far north as 73°.

In the summer, from the end of May to the middle of September, the weather is warm and comfortable, when the wind blows from the east; though violent storms then occur, and
and the fogs on the sea-coast are Indescribably. The land near the shore exhibits a pelting verdure, but the inland mountains are perpetually covered with ice and snow. Beyond the 68th degree of latitude the cold is very intense, so that the rocks often burst by the frosts; and towards the end of August, the whole coast is covered with ice, which never thaws till April or May, and sometimes not till the latter end of June. The prodigious mists of ice that surround the whole coast exhibit an appearance, in calm weather, no less dazzling than dreadful, by the reflection of the sunbeams in its variety of colours; but when the wind blows and the waves are lifted up in mountain billows, these mists of ice differing against one another occasion blocks that make the observer tremble. Thunder and lightning seldom occur in Greenland, but the Aurora Borealis has frequent, and brilliant appearances. At the time of new and full moon, the tide rises and falls upon this coast about three fathoms, and the springs and fountains on shore rise and fall with the flux and reflux of the ocean.

The soil of Greenland refembles that of other mountainous countries, the hills being barren, and the valleys and low grounds, especially near the sea, rich and fruitful. It is, for the most part, unfertile clay or sand. But whatever is said of the fertility of Greenland is applicable only to that part which lies between the 65th and 67th degrees of latitude. The most northern parts are totally deftitate of plants and this. The soil is faid to have formerly produced a great number of cattle, and to have exported considerable quantities of butter and cheese to Norway. Some parts of the country yielded excellent wheat, and the oats that grew in it were so large as to furnish acorns as big as apples. In its present state, however, though some oats remain, and the traces of ploughed land are perceivable, Greenland is defstitute both of corn and cattle; but its nature is good, and if the soil were properly cultivated, it would probably yield grain. It produces excellent turnips and coleworts. The fides of the mountains near the bays are clothed with wild thyme, of powerful fragrance. The country abounds also with many other plants, and among its fruits we may reckon juniper-berries, blueberries, bilberries, and Bramble-berries.

The animals which are most abundant, are rein-deer, dogs resembing wolves, (see Don.) arctic foxes, and white or polar bears. Hares of different colours are common, but they are smaller than thofe of Denmark and Norway. The walrus, and five kinds of seals, frequent the shores. Here are found also ravens in great numbers, eagles of a very large size, falcons, and other birds of prey, and likewise a limnet, which warbles very melodiously. Whales, sword-fish, porpoises, &c., abound on the coasts; and also halybat, turbat, cod, haddock, &c. The species of insects exceed 90. The more dubious animals, which are said to inhabit these seas, are the mermaids, sea-mermen, and krakens. The polar bear, seals, and manate, says Pennant, (Arctic Zoology,) were originally natives of these countries. The other quadrupeds found their way here from either Hudson's bay or Labrador, on the islands of ice. The arctic fox found the fame kind of conveyance from Greenland to Iceland as it did with the rein-deer to Spitzbergen. To the last was wafted, probably from Labrador, the common weasel, the red or common fox, and the mout, which miffed Greenland, but flucked Iceland; and the common bat, which was originally temped driven to the latter from Norway; the volevere and varying hare never reached farther than Greenland. This, says Pennant, seems the progres of quadrupeds in the frigid zone, as high as land is found.

Greenland is thought to contain many mines of metal. To the southward of the Danish colony are fome appear-

ances of a mine of copper; Mr. Egede once received a lump of ore from one of the natives, and here he found calamine of a yellow colour. Crantz observes, that the highest mountains of this country are on the west side, and the rocks are full of elefs, commonly perpendicular, and seldom wider than half a yard, filled with spar, quartz, tale, and garnets. The rocks are generally rather vertical or some what inclined, confifting of granite, with fome sand-tone and lapis oilarz. Crantz also mentions micaeous schistus, coarfs-

marble, and verquiterne; with albeftus and amanatus, cry-

tals, and black fchoot. It is said that duste of argyll, a new fubflance, has been recently found in Greenland; and this is perhaps the foft transparent (one of Crantz. The lapis oilaris is of singular utility in Greenland, and the north of America, as it is used for lumps and culinary utensils.

The prefent inhabitants of the western coast of Greenland, and who are the defendants of the ancient Skrælings, whom we have already mentioned, and who exterminated the Jeland colony, very much refembe the American Samoide and Laplanders in their perfons, complections, and way of life. They are without doubt a branch of the Equimauk of Labrador, who fed that country, and peopled Greenland. They are short, brawny, and inclined to corpulence; with broad faces, flat noses, thick lips, black hair and eyes, and a yellowish tawny complexion. They are for the mofi part vigorous and healthy, but very short-lived, few reaching the grand climacteric, and many dying in their infancy, and in the prime of their youth. The hardness of the wind, and the glare of the fnow, render them subject to a disorder of the eyes. They are also afflicted with the leprous; and those who inhabit the northern parts are miferably tormented with dyeritries, rheums and pulmonary disorders, boils, and epithelis. The small-pox in 1744 made dreadful havoc among these people, who have no aid from missionaries, and who depend merely on their "Angekoks," or con-

jurers. The Greenlanders, with regard to their confitutional temperament and disposition, are cold, phlegmatic, indolent, and dull of apprehension; but quiet, orderly, and good-humoured. They live peaceably together; have every thing in common, without strife and animosity; and strangers they are civil and hospitable. They never wash themselves with water, but lick their paws like the cat, and then rub their faces with them. They eat after their dogs without washing their dishes; devour the ice which devote them; and even lick the sweat, which they scrape off from their faces with their knives. The women wash themselves with their own urine, under a notion that it makes their hair to grow; and in the winter-time immediately expose themselves to the air, that the liquor may freeze upon their skin.

In their general habit and manner they are intolerably filthy. In times of scarcity they fubhxt on pieces of old skin, reeds, sea-weed, and a root called "tugboronet," dressed with train oil and fat. The dung of rein-deer taken from the interlines, the entrails of partridges, and all sorts of offals, are counted dainties among these savages; and of the scrapings of seal-fkins they make delicate pancakes. The Danifh provisions were at first tailed by them with disguft and abhorrence; but they are now become fond of bread and butter, though they still retain an averton to tobacco and spirituous liquors. The Greenlanders in common content themselves with one wife, who is condenmed to drudgery, and liable to be divorced at the pleasure of the husband. Persons of superior rank and qualities are, however, indulged with a plurality of wives. Their young women are generally chaffe and lavish; nevertheless, at some of their feasts the men retire with the wives of their neighbours for licentious amours. Their superstitious customs are innumerable; e.g. when
a woman is in labour, the goffips hold a chamber-pot over her head, as a charm to hallow the delivery, and when a child is a year old, the mother licks and flabbers it all over, to render it, as she imagines, more strong and hearty. Their cloaths are made of the skins of rein-deer, seals, and birds. The men wear their hair short, commonly hanging down from the crown of their head on every side, and squared off at their foreheads. Some cut it off as high as their poll. But it would be a reproach to a woman to cut off her hair, which is never done except in cases of the deepest mourning, or if they resolve never to marry. All the Greenlanders speak the same language, though different dialects prevail in different parts of the country. Some few words are probably the relics of the old Norwegian; but these excepted, their language seems to have no affinity to etymology, declension, or signification, with any of the Northern, Tartar, or Indian languages, as far as they are known to us; but we must except the language of the Eskimaux in Labrador, whom, we have already said, to be one people with the Greenlanders. Their great number of polyfylables, and of repeatedly combined words, make their language very intricate. Nevertheless, it abounds so much with words, that the Greenlanders, like the Cimbic Tartars, have a proper word for every object or art that requires the least distinction. Besides, their words are varied and declined with such different modifications, yet according to a fixed rule with few exceptions, and are attended with prelites and suffixes, far more than the Hebrew, that the language is not only graceful, but plain and unequivocal. Moreover, they join many words together, as we have already said, like the North Americans, so that they can express themselves very concisely and yet significantly. Some of our letters are wanting in their language, and they never begin a word with B, D, F, G, L, R, or Z. They seldom join many con- sonants together, and never at the beginning of a syllable. The accent, upon which much depends, must be laid upon the proper syllable, commonly the last; and the Greenlanders, especially the women, accompany many words, not only with a particular accent, but with a certain significant aspect, which is necessary to be regarded in order to ascertain their meaning. They have but few adjectives, and these are mostly participles; they are placed after the substantives, which always begins the sentence. Substantives, as well as verbs, have singular, dual, and plural numbers, but no gender and they resolve never to marry. The Greenlanders are formed according to the different termination of the word, with few exceptions. The declensions are easy; the genis- tive has at the end a, or if a vowel follows, an m, either by addition or change; and the rest of the cases have a pre- position affixed to them. The pronouns are not placed be- fore the word, but one or two of its letters are attached to it at the end, and in different ways according to the different numbers. They have only five prepositions, which are not set before the nouns, as in other languages, but at the end, and again are varied in declining. The verbs have been divided into five conjunctions, according to their termina- tions. They have three tenses, the present, the perfect, and future; and they have six moods, the indicative, imperative, permissive, conjunctive, and infinitive. The Greenlanders have no verbs deponent nor passive, but the latter are formed from the active by some adjunction. They have several classes of adverbs, like other nations; but their numerals are few, so that they can scarcely count five; but in order to arrive at 20, they count the fingers of both hands and the toes of both feet. If they want to proceed farther, they begin again with their fingers and toes. They tack their conjuctions to the end of a word, as the Latins do their give; and they do not want interjections. Their syntax is simple and natural; the capital word stands in the front, and the rest follow in order according to their importance. Their style or mode of speaking is not at all hyperbolical, pompous, or bombastic, like that of the oriental, but simple and natural; yet they are fond of similitudes and metaphors. Their poetry has neither rhyme nor measure; but it confits of short periods; which, however, are sung to a certain time and cadence.

The Greenlanders have no traditions of the most memorable events of their ancestors in heroic fongs, as other nations have; who poetics no written records. All they can say of their progenitors is, that they were brave seal-eatchers, and that they killed the old Norwegians. Yet in their factual fongs, to which they are much addicted, they are more acute. They are well versed in genealogy, and can often trace their pedigree as far back as ten of their progenitors, together with all the collateral branches. Their imperfect arithmetic we have already noticed. Of writing they have no conception. On their first acquaintance with Europeans, they were frightened by speaking paper. In chronology, they reckon their years by winters, and their days by nights. They are not learned enough to fix the equino- xes, but they can guess at the winter solstice, within a few days by the fun-beams upon the rocks; and then they celebrate their new year by a fun-feast. From hence they reckon three full moons to the spring, and then they move from their winter houses into tents. In the fourth moon, i.e. in April, they know that the small birds make their ap- pearance, and the ravens lay eggs. In the fifth their angmarket, and the seals with their young ones give joy to their coals by their revolutionary visit. In the fith the eider-fowls breed. When they lose the moon in the bright summer nights, they carry on their calendar partly by the growth of eider- fowls, and size and shape of the seals, and partly by the shining of the moon on the dial of the rocks and mountains; so that they exactly tell when the seals, fishes, and birds will arrive in flocks and fhalos here and there, and when it is time to repair to the winter-houses, in which they generally shaf- ter themselves soon after Michaelmas. They divide the day according to the chb and flood, and the night by the rising and setting of certain stars. They think the globe of the earth stands upon polls, which are so rotten with age, that they often crack; and that they would have funk long ago, if they had not been kept in constant repair by the Angle- koks, who sometimes bring back a piece of rotten wood as an evidence of their important service. Their astronomoy makes the firmament to rest on a lofty pointed hill in the north, and on that centre it performs its revolutions. But this specimen is sufficient. When it thunders, two women are flretching and flapping a dried seal-skin, and the thunder is occasioned by that rattle. The mystery of the Aurora Borealis is unravelled by the fous of the dead friaking at a dance or a foot-ball. The rains are the overflowings of the celestial reservoirs; and if the banks should break, the sky would fall down. Such is their meteorology! In medicine and surgery they are no less ignorant than in the other sciences.

When a Greenlander is in the conflicts of death, they ar- ray him in his bell cloaths and boots, and bend his legs up to his hips, probably that his grave may be the shorter. After death, they febiously bewail him for a short hour, and next prepare for his burial. The corpse, being wrapped and sewed up in the man's best seal or deer-skin, is laid in the burying place, covered with a skin, and also with some green fods, and finally with heaps of great broad fones to keep off the birds and foxes. Near the burying spot they deposit the
the kajak and darts of the departed, and the tools he daily used; or if the deceased was a woman, her knife and sewing implements, that they might not be defiled by them, or row too much on their account, or because they should want them in another world. After the interment, those who attended the procession, betake themselves to the house of mourning: then the men sit silent for some time with their elbows leaning upon their knees, and their heads between their hands; while the women lie prostrate upon their faces on the ground, and softly weep and sob. Then the nearest relation pronounces an eulogy, reciting the good qualities of the deceased, and at every period deploiring his loss with loud crying and weeping. After this mournful diry, the women continue their lamentations in a tremendous howl. This kind of mourning is continued for a week or a fortnight. The howling is after intervals renewed, and prolonged for some weeks, and in some cases for a whole year.

As for the religion, or rather the superlition of the ancient Greenlanders, they are reported to be such gross idolaters as to worship the fun, and sacrifice to the devil, that he might forward, or at least not hinder, their hunting and fishing. The first missionaries, however, conceived that the Greenlanders had no kind of religion or idolatrous worship; and that there was not any observable trace of their entertaining any conception of a Divine Being. Others, however, have thought, with greater reason, that a faint idea of the Divine Being lay concealed in the minds of these people, because they directly alluded without any objection to the doctrine of God and his attributes. Among the Greenlanders, different opinions are entertained concerning the soul of man; some supposing that it is material or corporeal, and others that it is a spiritual essence, different from the body, and all material substances, and capable of surviving after death. They seem to have some confused and indistinct notions of a future state: of the place which is to be the final abode of good men; and of the nature of their reward. The most stupid Greenlanders, it is said, conceive a horror at the thoughts of the entire annihilation of the soul. They place their hell in the subterranean regions, which are devoid of light and heat, and filled with perpetual terror and anxiety. The Greenlanders speak of other superior and inferior spirits, besides the soul of man, which bear some resemblance to the major and minor gods of the ancient heathens. Of the first rank there are only two; a good spirit and a bad one. Besides the great spirits to an audience with whom an Angekok only can be admitted, there are other lesser spirits in all the elements.

The Greenlanders believe in apparitions, of the ghosts of the deceased. The 'Angekoks' are their forefathers or diviners, to whom peculiar privileges and honors belong. Although the Greenlanders have neither religion nor government, they are free from many of the grogger vices, which may be found among persons much more enlightened than themselves.

The traffic of the Greenlanders is very simple and concise, and is carried on altogether by barter. They very rarely cheat, or take the advantage of one another, much less steal, which they reckon infamous; but they glory in over-reaching, or robbing an European, because they think it is a proof of their superior wit and ingenuity. Their traffic is carried partly among themselves, and partly with factors and seasoners. Wherever there is a great assembly, or rendezvous of Greenlanders, as at a dancing match, or the fun-feaft in winter, there are always some that expose their wares to view, and announce publicly what goods they want in exchange. As those in the south have no whales, and those

in the north no wood, many boats of the Greenlanders coast every summer out of the south, and even from the east side of the land, and proceed from two to four hundred leagues, as far as Dîko, with their kajaks and women's boats, and the tackle and implements belonging to them, and barter wood for the horns of the unicorn, their women's boats, and whale's bones, and whale's fins, and part of these they track on their return home. In these voyages they take with them their whole family and household, and sometimes form a new settlement in the course of their voyage. The Greenlanders vend their fox and seal-skins, and especially their blubber, to agents or factors, and receive in return iron points for their darts, knives, lock-faws, gimblets, chisels, and sewing needles; also, striped linen and cotton, kerseys, woollen stockings and caps, handkerchiefs, cloths or boxes, wooden dibles, pewter plates, copper kettles, looking-glasses, comb, ribbons, and all sorts of toys for children. They are fond of buying snuff, also guns, powder, and shot; tobacco, which they use only as snuff, serves instead of small money with them. Indeed, they expect a little tobacco for every service they perform.

The assembly for dancing, and the fun-feaft above-mentioned, are not religious acts or ceremonies, but mere sports and amusements. The fun-feaft is kept at the winter solstice, and is a joyous occasion, and the return of the fun, and the renewal of good hunting and fishing weather. These dances are performed all over the country in large parties, and treat one another in the best manner they are able. When they have gorged themselves with food, they rise up to play and to dance. The means of intoxication they do not poifols, and drink only water. Their only musical instrument is the drum, which is beaten to common musical time. The music and dancing are accompanied with a song in honour of seal-catching, and such kinds of exploits; the performer extols the noble deeds of his ancestors, and expresses his joy at the return of the fun in the hemisphere. Every stanza of his ode is accompanied by the auditory. The following is a specimen of a complete cantata; the second and fourth lines expounding the chorus:

"The welcome fun returns again,
Anna ajah, ajah, ah-hu!
And brings us weather fine and fair,
Anna ajah, ajah, ah-hu!"

Such dancing meetings are appointed at other seasons of the year, when they have leisure to attend them. It is somewhat singular, and deserves mention, that they decide their quarrels by singing and dancing, and they call this a "Singing Combat." A Greenlander, who conceives himself injured, composes a satirical poem, and repeats it often with singing and dancing, till his domestics, and particularly the women, are able to remember it. He then publishes a challenge that he will fight a duel with his antagonist, not with a sword but with a song.

The respondent appears in the appointed place; when the accuser begins to pronounce his fatre to the beat of the drum, and his party join with repeating "Anna ajah," which occasions laughter among the attendants.

The defendant then returns in the same manner, and the laugh changes fides; the plaintiff again renews the same kind of afflnt. The whole body of attendants constitute the jury, and cosfer the baud on the victor, and afterwards the two contending parties are the best friends.

The Greenlanders are employed throughout the whole year in fishing or hunting. At sea they pursue whales, morfs, seals, fih for food, and seas-fowl. On shore they hunt the rein-deer in different parts of the country. And they have
GREENLAND.

methods peculiar to themselves, and corresponding implements, for accomplishing their objects both by sea and land; which we shall not here detail. The Greenland canoe, or "kalaq," like that in Nova Zembla and Hudson's bay, is about three fathoms in length, pointed at both ends, and 3 of a yard in breadth. It is constructed of thin rafts fastened together with the skins of animals, and covered with dreidled seal skin, both above and below, so that only a circular hole is left in the middle, large enough to admit the body of one man. Into this the Greenlander thrusts himself up to the waist, and fastens the skin so tight about him that no water can enter. Thus secured, and armed with a paddle broad at both ends, he ventures out to sea in the most stormy weather to catch seals and sea-fowl; and if he is overcast, he can easily raise himself by means of his paddle. The "kone-boat" is made of the same materials, but more durable; and so large that it will contain 50 persons with all their tackle, baggage, and provisions. It is fitted with a mail, which carries a triangular sail made of the membranes and entrails of seals, and is managed without the help of braces and bowlines. These kones are flat-bottomed, and sometimes 60 feet in length. They are built by the men themselves, who are obliged to do all the drudgery, including even the building and repairing of their houses, while the men are wholly employed in preparing their hunting implements and fishing tackle.

Greenland is a country very thinly inhabited. In winter they live in hovels and in summer in tents. The hovels are constructed of stones, on a deep rock, with layers of earth and sods between them. On these walls they rest the beam, or connected beams, for the length of the hovel, being from 4 to 12 fathom; and over these they lay the rafters, with small wood between them; the whole is covered with bilberry-bushes, and then with turf, with fine earth on the top. Their hovels have neither door nor chimney; the use of both being supplied by a vaulted passage made of stone and earth, entering through the middle of the house. The walls are hung on the inside with old worn tent and boat skins, fastened with nails made of the ribs of seals; and the roof is covered with them on the outside. In these huts, so constructed, they are guarded from wind, damp, and cold. The floor is divided into several apartments, separated by skins, according to the number of families for which it is designed. On these floors they sleep on pelts; and they commonly fit them all day long, the women cooking and sewing, and the men carving their tackle and tools. On the front wall of the hovel are several square windows, about two feet in size, made of seal's guts and halibut's maws, and fewed so neat and tight, that the wind and snow are kept out, and the light let in. These huts are all well warmed with fires, and lighted by means of lamps filled with train oil, and furnished with masts instead of a wick, which burns so bright that the hovel is both lighted and warmed by it. Over the lamp is suspended a bollard-marble kettie, in which they boil all their meat; and over this again is a wooden rack, on which they lay their wet cloaths and boots to dry. On the outside of their dwelling-houle they have their little store-houses, in which they lay up their little flock of flicht, fish, train oil, and dried herrings; and close by their store-houses they lay their boots, with their bottoms upwards, under which they hang their hunting and fishing tackle and their skins. Their summer tents are made with poles, put together in a conical form, covered on the inside with reindeer skins, and on the outside with seal-skins, doubled, or so dreidled that the rain cannot penetrate them. Crantz's History of Greenland, vol. 1.

GREENLAND, Eofs, or SPITBERGEN, was formerly con-

sidered as part of the continent of West Greenland, but it is now known to be a collection or group of islands, varying in their extent, and lying between 76 46' N. lat, the latitude of the South Cape, and 80° 30', the northernmost point of the Seven islands, and between 9° and 23° E. long. Sir Hugh Willoughby, who first discovered land in this high northern latitude, A.D. 1553, called it Greenland; conceiving it to be part of the western continent. It was afterwards visited, A.D. 1595, by William Barentz and John Cornelius, two Dutchmen, who claimed the honour of the first discovery, and called the country "Spitbergen," or sharp mountains from the numerous sharp pointed and rocky mountains which they observed in it; and in order to ascertain their own claims, they pretended that this was not the country discovered by Sir Hugh Willoughby, which in the maps and charts delineated by the Hollanders was denominated Willoughby land, though no such land ever existed. It is moreover said, that before the voyage of the Dutchmen, an English navigator, whose name was Stephen Barrows, had coasted along a defolate country from 79° to 80' 11' N. lat. which mull have been Spitbergen; this coast being very minutely visited by different times by navigators, who were employed in exploring a passage to the East Indies by the north-pole; a project which was suggested and strongly recommended by Robert Thorne, a merchant of Bristol, as early as the year 1527. Bourne, in his "Regiment of the Sea," written about the year 1577, mentions this as one of the five ways to Cathay, and seems to admit the practicability of it from a mistaken notion of the mildness of the climate near the pole, owing to the constant prevalence of the sun during the summer. In 1607, a voyage was proposed by some London merchants, for the discovery of a passage by the north pole to Japan and China, and it was undertaken by Henry Hudson, who fell in with land to the westward in 73° N. lat.; and soon after he fell in with Spitbergen, where he met with much ice; and this navigator advanced to the latitude of 80° 35'; but he was prevented from proceeding farther by an ice. In 1609, Jonas Poole was appointed by the Muscovy company on the same service; and he with much difficulty made the north part of Spitbergen, afterwards failing along and founding the coast, giving names to several places, and making many very accurate observations. Having twice attempted in vain to get beyond 79° 30', he was obliged to relinquish his object and return home. A second attempt in the following year was equally unsuccessful. In the year 1614, another voyage was undertaken, in which Baffin and Fotherby were employed; and Fotherby made a second attempt in the following year; but their progress was obstructed by the ice. This country and the adjoining seas have since been frequently resorted to by ships employed in the whale fishery; but its situation was never accurately ascertained till Captain Phips (now lord Malgrev) undertook a voyage by order of his majesty George III. in the year 1775. He found that the land, which was formerly supposed to extend as far as 78° N. lat., terminated with the "Seven islands," the most northerly point of which does not exceed 80° 30' N. lat. He observed other lands lying eastward at a considerable distance; but Spitbergen was found to be encompassed by water and in no part of it to be contiguous to the continent of Asia. He explored, with a degree of resolution and perseverance that did honour to himself and his associates in this expedition, the northern and western coasts, though he was prevented by the ice from advancing so far northwards as he wished; and he ascertained by accurate observation the longitudes and latitudes of several points, capes, and bays, which he visited. On his approach to the land
land he picked up a piece of drift wood, which was found to be fir, and not worm-eaten; and upon standing close in with the land, the coast appeared to be neither habitable nor accessible; it was formed by high, barren, black rocks, without the least marks of vegetation; in many places bare and pointed, in other parts covered with snow, appearing even above the clouds; the valleys between the high hills were filled with snow or ice. "This prospect," he says, in his "Journal," printed in 1774, "would have suggested the idea of perpetual winter, not the mildness of the weather, the smooth water, bright sun-dine, and constant day-light, given a cheerfulness and novelty to the whole of this striking and romantic scene." The current on this coast was found, both by the common and Bouguer's log, to run north half a knot an hour. The height of one mountain, above the level of the sea, was found by measurement with the meganeter, to be 15,035 feet, but by M. de Luce's calculation from observations with the barometer it was found to be 1560.

Among the harbours in which captain Phipps anchored, we may mention a small bay to the southward of Magdalena Hook and Hamburgher's bay; the former in N. lat. 79° 34', the same as Fotherby observed it to be in 1614: the high-water in this bay full and change at half an hour past one, or with a S.S.W. moon, which agrees exactly with Baffin's observation in 1613, the flood coming from the southward. Another anchoring place was Vogel Sang, N. lat. 79° 50'. E. long. 10° 2' 30"; the north eastermost point being the Cleven cliff, 79° 55'. E. long. 9° 59' 30", a bare rock so called from the resemblance of its top to a cloven hoof, which appearance it has always exhibited, having been so named by some of the first Dutch navigators who frequented these seas. It is also nearly perpendicular, so that it is never disregarded by snow, and on these accounts it is one of the most remarkable points on the coast. The southermost land is a high bluff point, called by the Dutch Vogel Sang. This found, though open to the northward, is not liable to any inconvenience from that circumstance, the main body of ice lying so near as to prevent any great sea; nor are ships in any danger from the fothe ice setting in, as this road communicates with several others formed by different islets, between all which there are safe passages. To all the sounds and harbours formed by this knot of islands the old English navigators had given the general name of Fair Haven, of which Fotherby took a plot in 1614. In this situation Hackluyt's Head-laid was found to be in N. lat. 79° 47'. E. long. 9° 11' 30". The tide rose about four feet, and flowed at half an hour after one, full and change. The harbour of Smeerenberg, distant about 11 miles, N. lat. 79° 44'. E. long. 9° 50' 45", has good anchorage in 13 fathom, sandy bottom, not far from the shore; and it is well sheltered from all winds. The island close to the place where our navigators lay is called Amsterdam island, the westernmost point of which is Hackluyt's Head-laid; here the Dutch formerly used to boil their whale-oil, and the remains of some convenues erected by them for that purpose are still visible. They once attempted to make an establishment, and left some people to winter here, who all perished. Nevertheless, as they seem to have died not through the intensity of the cold, but in consequence of being attacked by the fearchy, and as others, both English and Russian sailors, have wintered here, a colony might be settled in this country, if such an establishment were likely to answer any good purpose. The Dutch ships still return to this place for the latter season of the whale fishery. The island found in this country was chiefly a kind of mable, which differed eaily in the marine acid. But our navigators perceived no marks of minerals of any kind, nor the least appearance of presents, or remains of former volcanos. Neither did they meet with insects or any species of reptiles; not even the common earth-worm. They saw no springs, or rivers; the water, which was found in great plenty, being altogether produced by the melting of the snow from the mountains. During their stay in these latitudes, they had no thunder or lightning. The sky was in general loaded with hard white clouds; so that neither the sun nor the horizon was wholly free from them even in the clearest weather. They could always perceive when they approached the ice, long before they saw it, by a light appearance near the horizon, which the pilots called "the blind of the ice." (See Blink.) One of the most remarkable phenomena which this country exhibited was the "iceberg." (See Iceberg.) Of the animals and plants of Spitzberg, captain Phipps has given an account in the appendix to his Journal. The animals are the arctic walrus, the common seal, the arctic fox, the polar bear, the reindeer, the common whale, the fin fish; and the birds the eider-duck, the puffin, the akeala, the fulmar, the colymbus-grylle and trolle, the northern diver, the larus rissa, the arctic gull, and larus eburneus, the greater term, the greater brabling, the sea-finial, the coal-fish, the prawn, the cancer-borens, or singular species of crab, and cancer nauxes, not before described, and also cancer amplus, and cancer pullex; several species of vermes, and shell-fish. Among the plants are a small species of agrotis, several species of fadragis, of bryum, of coelcheairs, and of lichen.

Greenland, a town of America, in Rockingham county, New Hampshire, near the sea, five miles souththerly from Portsmouth, incorporated in 1713, and containing 548 inhabitants.

Greenland Fishery. See Whale Fishery.

Greenland Company. A joint flock of 41,000, was by statute to be called by subscribers, who were incorporated for fourteen years from the first of October 1663, and the company to use the trade of catching whales, whaling, &c., into and from Greenland, and the Greenland feals; they may make bye-laws for government, and of the persons employed in their ships, &c. (Stat. 4 and 5 W. III. cap. 17.) This company was further encouraged by parliament in 1666; but partly by unskillful management, and partly by real losses, it was under a necessity of entirely breaking up, before the expiration of the term assigned to it, ending in 1707. But any person who will adventure to Greenland for whale-fishing, shall have all privileges granted to the Greenland company, by 1 Anne, cap. 16, and thus the trade was again laid open. Any subjects may import whale-fish and oil, &c, of fish caught in the Greenland seas, without paying any custom, &c., Stat. 15 Geo. I. cap. 16. And ships employed in the Greenland fishery are to be of such dimensions provided with boats, for many men, fishing-lines, harping-iron, &c., and he to be licensed to proceed; and on their return shall be paid 22s. per ton bounty, for whales, &c., imported. 6 Geo. II. cap. 53. See Whale Fishery.

Greenlaw, in Geography, a town of Scotland, which, though the county-town of Berwickshire, is an inconsiderable place, pleasantly situated in a plain, bathed by the Blackadder or Blackadder. The acclivities of the surrounding escumences are tolerably cultivated. In its vicinity, about midway between Greenlaw and Kelso, on a rising ground, is Herne castle, which commands a view of the greatest part of the Merse and Roxburghshire, and was celebrated during the contentions on the border. It was a noted place of defence, often besieged by the English, and demo-
GREENOCK.

lified by Cromwell. It is distant 37 miles S.E. from Edin-

burgh, and contains 1270 inhabitants.

GREENOCK, the principal sea-port town on the firth

of Clyde, situated on the south bank of the river, about

24 miles below the city of Glasgow. The town of

Greenock is pretty well situated for commercial purpo-

ses, but in other respects it is neither pleasant nor so

circum-

This

stanted as to afford the prospect of any great increase either

of

extent or population. Indeed the great number of young

men, who, from habits of imitation as in other sea port

towns, early attach themselves to a seafaring life, must

prevent of itself a great obstacle to the latter. The town of

Greenock is held under and is entirely surrounded by the

lands of Sir John Stewart of Blackhall, bart., who is feudal

superior, and no purchase or acquisition of ground, either

for the purposes of extension or improvement, can be had

from any other person. This must of itself render exten-

sion a matter of more difficulty than where there are many

landed proprietors, the lands of some of whom, from the

common casualties and vicissitudes of human affairs, must

be occasionally in the market.

The harbour of Greenock is divided into two compart-

cents, and is entirely surrounded by well-built and com-

modious quays of freestone. The entrance is narrow, and in

the centre opposite to the end of the tidal quay, which serves

as the division of the harbours. The eastern branch is

shallow, and is therefore mostly frequented by coasting

vessels, herring busses, fishing boats, and other small craft.

The west harbour, being considerably deeper, is the general

repos of West Indiamen, American traders, and other

vessels of greater burthen. In the west harbour is a very

capital dry or graving dock, with flood gates to exclude

the water, and capable of containing two large ships at the same

time. It has been long in contemplation to improve the

harbour of Greenock by the erection of wet docks, similar to

those of London, Liverpool, Hull, and Leith, but proba-

bly from the difficulty of engaging the joint conset

of the numerous interests concerned, and other causes, no

steps have been hitherto taken for carrying this

scheme into effect. The principal deficiency of the harbour

of Greenock, exclusive of the ships bottoms taking the

ground every cbi tide, arises from want of water, there

being never more than fourteen or eighteen feet in the har-

bour, even at spring tides. Hence large vessels are obliged

to discharge part of their cargoes into lighters in the roads

before they can come into the harbour at all. This is

of itself a consequence where the cargo is to be brought to

Glasgow, if the weather be mild, but it is very inconvenient

and expensive when the cargo is to be landed, and when

the weather be boisterous. The whole rife of the tide at

Greenock is only about twelve feet, whereas at Liverpool

it is thirty-six and at Bristol forty-two. This also forms an

additional disadvantage to the harbour of Greenock, and

prefents a very great obstacle to every plan of artificial

improvement. With all these disadvantages, however, it has

many advantages over the neighbouring harbour of port

Glasgow, situated about three miles farther up the river.

The chief obstacle to vessels of great burthen making any

of these ports, is an immense bank of sand, accumulated

for many ages in this embouchure of the Clyde by the current

of the river, and which is feebly though slowly increasing.

Indeed nearly opposite to port Glasgow, this bank is en-

tirely uncovered for miles at low water. Notwithstanding

these natural disadvantages, the favourable situation of the

Clyde for maritime intercourse with every part of the

western hemisphere and the south of Europe, the great

coasting trade with the western parts of England and Wales,

and with Ireland, and the extensive herring fishery, has raised

Greenock to a high rank among the commercial ports of

Britain, and has been productive of the acquisition of splen-
did fortunes to many of the principal inhabitants. As

Greenock is not the seat of any staple manufactory, this

carrying trade is her chief, and indeed may be fairly called

her only support. During the American war, when the

carrying trade was entirely suspended in some channels, and

greatly impeded in all the others, a number of ship-owners

fitted out their vessels as privateers, but in general these

speculations were not productive of gain to the adventurers,

and in some instances with furious loss. In the recent wars

no attempts at privateering have been made.

The town of Greenock is governed by two magistrates,
elected annually, and a council; besides whom, the baron

bailli, nominated by the superior, also presides at the judi-

criff court of the county of Renfrew is held at Paisley, to

which the inhabitants of Greenock are ame-

nable; the same as the rest of the county.

In the external appearance of Greenock there is little

elegance or splendour to be seen. In the centre of the town

there is a small square, immediately fronting the mid-quay,

which divides the harbour. In this square is a very hands-

tome church of modern architecture. The other buildings

are the inns, of which the chief, recently built upon a tone

tine scheme, like that of Glasgow, is a very spacious, and

even splendid house. There is also a small neat theatre, the

private property of Mr. Stephen Kemble, the manager, and

some dancing-halls for the occasional recreation of the

inhabitants and strangers, of whom, from the maritime

situation, there is, at certain feasons, particularly at the arrivals

of the West India fleets, a considerable influx.

The scenery of the Clyde around Greenock is picturesque

and sublime. The river is about seven miles broad to the

opposite shore, where the village of Helensburgh is erected upon

the property of sir James Colquhoun of Lüfs, bart. This

village is built in a very pleasant situation, upon a fine bay,

formed by two projecting promontories, viz. by the hill of

Ardmore, on the cafl, and by Rofeneath, the property, and

one of the splendid residences of the duke of Argyle, on

the west. Beyond this, to the westward, appear the lower-

ing mountains of Argyllshire, between which is the vall

arm of the sea, Lochlong, which is twenty-four miles in

length, and in some places faid to be unfeatablely deep. About

twenty miles to the west is a small village, called Gourouk,

situated on a very fair deep bay, well sheltered by project-

ing head-lands, with a very good bottom for anchorage.

It is the opinion of most professional men whether engineers

or seamen, that this situation affords by far the greatest

number of natural advantages for a large and commodious

sea-port upon the Clyde; and it is almost singular that

Greenock should have riven to its present commercial im-

portance, whilst Gourouk, situated within les than two

miles, and possessing every superiority of physical advan-

tage, should have remained an insignificant village. Howev-

er this may have originated, too much capital has now been

expended upon Greenock and Port Glasgow, to leave the

smaller room to fuppose that they will be in any respect

rivalled by a village which possesses nothing but natural

situation to recommend it. On the road from Greenock to

Gourouk are many very fine villas, belonging to the

opulent merchants of Greenock. At both Greenock and

Gourouk are extensive row-works, belonging to the fame

company of proprietors. A little below Gourouk is the

Clonch light-house, a very high and well-built tower, lighted

by reflectors, for the safety of vessels coming up, or going

down the channel during the night. Some miles below this
this is the island of Bute, belonging chiefly to the nobility. Bute is about seven miles long, and generally level and fertile. Mount Stewart, the residence of the noble proprietor, is situated near the middle of the island, on the south side, and is a superb and delightful place. Of the other proprietors, Lord Ban- 

nairne, one of the Scottish judges, is the most conspicuous. The chief, and, indeed, almost only town on the island, is Rothsay, from which his royal highness the prince of Wales derives one of his Scottish titles; is a handsome, clean, small town, and has a considerable cotton mill and manufactory by it, belonging to a company of manufacturers in Glasgow. There are also the ruins of an old castle, which appears to have been of great extent, and once belonged to the royal family of Scotland. The inhabitants of Rothsay are chiefly sea-faring people, and employ themselves much in the her- 

ring fishery during the season. Large quantities of fine cod- 

fish are also caught off the coasts of Bute, Arran, and 

Argyylehire, with which the markets of the west of Scotland 

are supplied, generally at a rate not exceeding two-pence per 

pound of 225 ounces. Contiguous to Bute is a small island, 
called Inch Marnock, which is level and cultivated. It is the 

residence only of those employed in its cultivation. The 

island of Arran is nearly thirty miles in length, and is very 

mountainous. The highest hill, called Cottifield, is seen from 
a great distance. The island of Arran is the property of the 

duke of Hamilton, who is earl of Arran, who has a fine 

house, called Brodieck castle, on the island, where his 

family sometimes reside, especially during the season for 

fishing grose or black game. Arran used to be much 

noted for a smuggling trade, both in contraband articles 
brought by the seamen employed in the vessels trading to the 

Clyde, and also in the distillation of whisky. The vigilance 
of the revenue cruisers in the Clyde has, in a great measure, 
checked the former, and that of the excise officers the latter. 

On Arran are found a number of fine stones, and it is some-
times visited by lapiaders, during the summer, for the pur-

pose of searching for them, or of purchasing those occasion-

ally picked up by the natives. On the island are only 
two small towns or villages, viz. Brodieck and Lamlash, the 

latter of which, being defended from the south winds by an 

island in the mouth of the bay, is reforted to as a shelter in 

stormy weather by the ships and vessels navigating the frith 
of Clyde.

Besides those already mentioned, there are a few smaller 
islands in the frith, viz. the Cumbraes, which are two small 
islands lying pretty close to the southern shore, near the 

Renfrewshire coast, opposite to the village of Largs, about 

16 miles below Greenock. The larger island is about two 
miles long, and on it is a very neat village, called Milport, 

chiefly inhabited by fishermen and seamen's families. The 

latter island is a mere rock, where a few persons reside, who 

take charge of the light-house, and sometimes perfuse in a 

frigate of infamy are boarded here by their relatives, on 

account of the purity of the air, and the retirement of the 

situation. Farther down, and near the Ayrshire coast, is the 

frequental rock, or crag of Ailfa, from which the proprietor, 

the earl of Caflus, derives his British title. Ailfa is a high 

abrupt and barren rock, totally uninhabited, and covered by 

myriads of sea-fowl, in search of which it is sometimes visited. 

Of the general trade of the Clyde notice has already been 
taken under the article Glasgow.

GREENMORE POINT, a cape of Ireland, in the county of 

Wexford, in the Irish sea. N. lat. 52° 16'. W. long. 6° 18'. from Greenwich.

GREENSBORO, a post-town of America, in Well-

Chellet county, New York; 264 miles from Washington. 

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GREENSBOROUGH, a post-town and chief town of 

Greene county in Georgia, 30 miles from Lexington: con-

taining 25 houses, a court-house, gaol, and Presbyterian 

meeting-house. Lands are appropriated for the establish-

ment of an academy in this town.—Also, a post-township 
in Orleans county, in Vermont, containing 280 inhabi-

GreeNSBURG, a post-town, and capital of Well-

morland county, in Pennsylvania, situated on a branch of 

Sewickly creek, which empties into Youghiogany river. 

It contains 100 dwelling houses, a German Calvinist church, 
a brick court house, a stone gaol, 270 miles W. by N. from 

Philadelphia.—Also, a post-town in Green county, Ken-

ucky; 875 miles W. by S. from Washington.

GREENSVILLE, a county of Virginia, encompassed 

by Brunswick, Southampton, and Suffolk counties, on the 

N. W. and E. and N. Carolina on the S. It is about 24 
miles long, and 20 broad, and contains 2611 free inhabitants, 

and 4116 slaves.

GREENVILLE, Sir Richard, in Biography, a gallant 

naval officer, son of Sir Roger, of an ancient family, in the 

GreeCE, England; was born about 1545. At the age of 

sixteen he obtained leave from queen Elizabeth, with others 

of his young countrymen, to serve in the imperial army in 

Hungary, against the Turks. Upon his return, he engaged 

with the troops employed for the reduction of Ireland, where 

he displayed to such courage and prudence, as to obtain 

the appointment of sheriff of the city of Cork. He sat in 

parliament in 1571, as knight of the shire for the county of 

Cornwall. He was afterwards high sheriff of the county, 

and received the honour of knighthood. Withstanding his 
civil employments, his attention was chiefly fixed upon plans 
of foreign discovery and settlement, proposed by his relation 

for Walter Raleigh. When the patents were made out for the 

purpose, sir Richard obtained the command of a squadron 

fitted out for the purpose, consisting of seven small vessels. 

With these he failed in the spring of 1585, and reaching 

the coast of Florida in June, he left there a colony of one 

hundred men, and then failed homewards. He made other 

voyages, but when the nation was threatened with the dangers 
of a Spanish invasion, he was appointed one of a council of 

war, to concert means of defence, and received the queen's 

commands not to quit the county of Cornwall, which prevented 

him from executing his intentions of making another 

voyage to the American coast. In 1591 he was appointed 

vice-admiral of a squadron, fitted out for the purpose of 

intercepting a rich Spanish fleet from the West Indies. This 

fleet, when it appeared, was conveyed by a very superior force, 

and Greenville was urged to tack about, but he preferred, and 

no doubt his sailors agreed with him, taking chance of 

breaking through the enemy's fleet, which almost immedi-

ately surrounded him. The Spanish admiral, with four 

other ships, began a close attack at three in the afternoon; 

the engagement lasted till break of day next morning, during 

which the Spaniards, notwithstanding their vast superiority, 

were driven off fifteen times. At length the greater part of 

the English crew being either killed or wounded, and the 

ship reduced to a wreck, no hope of escape remained. The 

brave commander had been wounded at the beginning of the 

action, but he cautioned his wounds to be dressed on deck, 

and refused to go down into the hold, and in that state he was shot through the body. He was now taken to the cabin, and 

while in the act of being dressed, the surgeon was killed by 
his side. The admiral still determined to hold out, willing 

rather to sink the ship than surrender, but the offers of 

quarter from the Spaniards induced the men to yield. Sir 

Richard was taken on board the Spanish ship, and honour-
ably treated, but he died of his wounds in less than three days. His last words were the temper of the hero, better than any eulogium that could be formed for him; they were spoken in the Spanish language. *Here die I, Richard Greenville, with a joyful and quiet mind; for that I have ended my life as a true soldier ought to do, fighting for his country, queen, religion, and honour; my soul departing from this body, leaving behind the lasting fame, of having behaved as every valiant soldier is in duty bound to do.*

This noble minded man has been blamed for rashness; but excess of bravery, if such it may be denominated, in a British than in a true soldier meets with a ready pardon, and such examples as Greenville and a Nelson, though not always to be justified on the score of prudence, have effected more advantages for this sea-girt island, than can be well described. 

Biog. Brit.

**GREENVILLE, Sir Bevil,** grandson of the preceding, was born in the year 1596. He was educated at Exeter college, Oxford, under the celebrated D. Prideaux, where he acquired a large stock of knowledge, and an ardent attachment to the established religion of his country. When he came to his estate he distinguished himself as a most respectable country gentleman, and fat, very often, in parliament, as knight of the shire for the county of Cornwall, and burgess of Lanceton. In 1638, he attended the king with a troop of horse, raised at his own expense, in an expedition to Scotland. For this service he received at the hands of his sovereign the honour of knighthood. He distinguished himself during the civil wars, and had a command in the battle of Stratton, gained by Hopton against the earl of Stamford, in May 1643. He was present, and made a considerable stand in other engagements, particularly in that which was fought at Landdown, near Bath, in which the parliament forces were commanded by Sir William Waller. In this action Sir Bevil, at the head of his Cornishmen, received a fatal blow with a pole-ax. His body was afterwards found, surrounded by the officers; and it was observed, to the honour of the gentlemen of England, that there were more officers and gentlemen, than common men, slain on the king's side. Sir Bevil was extremely lamented: his character was drawn by lord Clarendon: *That which would have clouded any victory, was the death of Sir Bevil Greenville. He was, indeed, an excellent person, whose activity, interest, and reputation was the foundation of what had been done in Cornwall, and his temper and affection for public, that no accident which happened could make any impression on him; and his example kept others from taking any thing ill, or at least seeming to do so: in a word, a brighter courage and gentler disposition were never married together, to make the most cheerful and innocent conversation.* A monument was erected to his memory on the spot on which he fell. 

Biog. Brit.

**GREENVILLE, in Geography, a county in Washington district, South Carolina; situated in the N.W. corner of the state; containing 11,504 inhabitants, of whom 1459 are slaves. This county is mountainous and hilly; but it is well watered, and the climate is pleasant and healthy.**—Allo, a poll-town of South Carolina, and chief town of Cheraws district; situated on the W. side of Great Pedee river, in Darlington county. It contains about 30 houses, a court-house, gaol, and academy; 55 miles E.N.E. from Camden.—Allo, a poll-town and capital of Pitt county, North Carolina, on the S. bank of Tar river, distant 23 miles from Washington, and containing about 50 houses, a court-house, a gaol, and a seminary, called the Pitt academy.—Allo, a poll-town of Mecklenburg county, Kentucky; 766 miles W. by S from Washington.—Allo, a poll-town in Jefferson county, Millip-

*pp.territory; 1217 miles from Washington.—Allo, a small poll-town in Green county, in the state of Tenneesee, situated on the W. side of the north-easternmost branch of Nolacheek river, about six miles N. by E. of Greenville college; 653 miles S.W. of Philadelphia.—Allo, a fort and settlement in the state of Ohio, on the S. side of a north-western branch of the Great Miami, six miles N.W. of fort Jefferson, on the same branch, about 23 miles S.E. of fort Recovery. It has ballons at each angle, and is capable of accommodating 2000 men.**

**GREENVILLE Bay, or La Bay, a town and port of entry on the E. or windward side of the island of Grenada. It has about 60 dwelling-houses, a church, and several rich flowers of Indian and European goods, and plantation utensils. Its situation is low and rather unhealthy.**

**GREENVILLE College, a college in Greenville county, in Tennessee, founded in 1794, by the first act of the first assembly of the south-western territory. It is situated between two small northern branches of Nolacheek river, not far from Greenville, (which fee) the county town. Its local situation conduces very much to its utility, for it is retired, healthy, cheap, and new public roads in all directions. It is under the management of 14 trustees, and possesses a library of between one and two thousand volumes, and philosophical apparatus, and a convenient building.**

**GREENWICH, a market-town and parish in the hundred of Blackheath, and county of Kent, England, is situated on the banks of the Thames, adjoining to Deptford, and 5½ miles distant from London. There are traces of a royal residence at Greenwich fo early as the reign of Edward I, A.D. 1300. Henry IV. dated his will in 1408 from this manor, which was granted by Henry V. to Thomas duke of Exeter, after which it was conferred on Humphrey duke of Gloucester, uncle to Henry VI., who, in 1433, gave the duke licence to fortify and embellish his manor-house, and to make a park of 200 acres; under this grant the duke rebuilt the palace, and included the park, in which he erected a moated tower. On the duke's death in 1447, the manor reverted to the crown; and was a favourite residence of Edward IV., who enlarged and furnished the palace. Henry VII. spent much of his time at Greenwich, where his two sons, Henry and Edmund, were born. Henry VIII. made considerable additions to the buildings, and during his reign Greenwich became one of the principal seats of that festivity for which his court was celebrated. Tournaments and revels were frequently held; and in 1513 the first masquerade ever seen in England was here introduced. Edward VI. kept his Christmas here in 1552, and died in this palace in July following. The queens, Mary and Elizabeth, were both born here, and the latter christened with peculiar state. She was particularly partial to this mansion, and made it her summer residence, passing the festive hours of that romantic period in various diversions and splendid exhibitions. This palace was frequently visited by James I. and Charles I; it was afterwards assigned by parliament to the Protector; and, after the restoration, again devoted, with the park and appendages, to the crown; when the king, finding the whole building in a ruinous state, ordered it to be pulled down, and commenced a magnificent palace of free-stone on its site, under the direction of Webb, the son-in-law of Inigo Jones, from whose papers the designs are said to have been made. One wing, however, was all that was completed, at the expense of 36,000£, in which the king occasionally resided; but no further progress was made in the building either in that or the succeeding reign. Soon after the accession of William and Mary, a project was formed for providing an asylum for aged and disabled lea-
GREENWICH.

and their majesties having resolved to carry it into execution, sir Christopher Wren recommended that the unfin
ished palace at Greenwich should be completed and enlarged for this purpose. His advice being adopted, he contributed
his time and abilities in the superintendence of the works for several years without any remuneration. Such was the origin
of Greenwich hospital, of which the foundation was laid June 3, 1696, and which has been gradually enlarged and
improved, till it arrived at its present height of magnificence. The hospital is a splendid and extensive structure, principally
built with Portland stone, and consists of four distinct quadrangular piles of buildings, distinguished by the names of
the respective sovereigns, in whose reigns they were founded or built. The grand front opens on a terrace, skirting the
northern bank of the Thames, and extends 865 feet in length, in the centre of which is a defect to the river, by a
double flight of steps. The ground plan of the whole edifice forms nearly a square; of which king Charles's building
occupies the north-west angle; queen Anne's, the north-east; king William's, the south-west; and queen Mary's, the
south-east. The interval between the two former buildings forms a square 270 feet wide, in the middle of which is a
statue of George II; sculptured by Rysbrach, out of a single block of white marble, which weighed eleven tons, and
was taken from the French by admiral sir George Rooke: this statue was given to the hospital by sir John Jennings,
who was governor from 1720 to 1744. The space between the two latter buildings which include the hall and chapel,
with their elegant domes, and the two colonnades, forms a lesser square, apparently terminated by the ranger's lodge
in the park. The two squares are interfected by a franeous avenue, leading from the town through the hospital.
The building, which immediately front the Thames have a general correspondence in style and arrangement. The north
and south fronts of each exhibit the appearance of a double pavilion, connected above by the continuation of an attic
order, with a balustrade, which surmounts the whole, but is separated below by an open portal: the centre of each pavilion
displays an elegant pediment, supported by four Corinthian columns, and the fides a double pilaster of the same order.
King Charles's building contains the apartments of the governor and lieutenant-governor, the council-room, and
anti-chamber; with fourteen wards, wherein 300 penitents may be accommodated. In the council-room are several por-
traits; in the anti-chamber two large figures, given to the hospital by Philip Harman, esq., representing the exploits of
his ancestor captain Thomas Harman of the Tyger frigate, in the reign of Charles II.; and a series of six small
pieces, descriptive of the loss of the Luxembourg galley, in the year 1737. Queen Anne's building contains several
apartments for inferior officers, with twenty-four wards, for four hundred and thirty-seven penitents. King William's
building stands to the south-west of the great square, and comprises the great hall, vaulted, and dome, designed and
erected by sir Christopher Wren, between the years 1698 and 1703. To the east of these adjoins a colonnade, three
hundred and forty-seven feet in length, supported by Doric columns, and pilasters twenty feet in height. The
great hall is one hundred and fifty feet in width, fifty-six in length, and fifty high: the cilding and fides are covered with
portraits and emblenctical figures, executed by sir James Thornhill, for which he was paid at the rate of 3l. per square
yard for the cilding, and 1l. for the fides, amounting in the whole to 2685l. The west front of King William's building,
which is of brick, was finished about 1725 by sir John Vanbrugh: the building contains eleven wards, wherein are
five hundred and fifty-one beds. The foundation of the eastern colonnade, which is similar to that on the west
side, was laid in 1699; but the cilding, and the other parts of
queen Mary's building which adjoin it, were not finished
until 1752. It corresponds with king William's, and is furnished
with one thousand and ninety-two beds, in thirteen wards.
The present chapel, one of the most elegant specimens of
Grecian architecture in this kingdom, was erected from the
classical designs of the late James Stuart, esq., better known,
perhaps, by the appellation of "Athenian Stuart," which he
acquired from the Attic elegance of his buildings, and his in-
teresting publication on the antiquities of Athens. The chapel
is one hundred and eleven feet in length, and fifty-two in width,
and is capable of accommodating one thousand penitents,
nurses, and boys, exclusive of the seats for the directors and
other officers. The portal consists of an architrave, frieze, and
corinstitute, of statuary marble: the folding-doors are of
mahogany, highly enriched by carving. The interior is
finis hed in an elegant style; and is adorned with many ap-
propriate paintings; the most distinguished of which is the
altar-piece, executed by Weil, and representing the prefer-
ence of St. Paul, on the throne of Melita; a subject peculiar-
ly adapted to this establishment. Without the walls of the
hospital lies the Infirmary, erected in 1762, after a design by Stuart: it forms an oblong quadrangle, one hundred and ninety-eight feet long, and one hundred and seventy-five broad; and consists of two stories for the reception respectively of those whose cases require
surgical aid, and of those who are in need only of medical asistance. It contains sixty-four rooms, each is fitted up for the accommodation of four patients. It also includes a chapel, hall, kitchen, and apartments for the
physician, surgeon, and apothecary; with hot and cold baths, and other necessary offices. The penitentiaries, who are the objects of this noble charity, must be fanned disabled by age, or maimed, either in the king's service, or in the mer-
chant service, if the wounds were received in defending or
taking any ship, or in fight again a pirate; foreigners who have served two years in the British navy, become entitled to the benefits of this institution in the same manner as
natives. The widows of familian are provided for, having the exclusive privilege of being nurses in the hospital. The number of penitentiaries is upwards of 2400, who are furnished with clothes, diet, and lodging, with a small allowance of
money. The nurses are 144, each of whom receives eight pounds per annum as wages, with every necessary of life.
The governors of the hospital are about 100, and consist of all the great officers of state, the archbishops, the
lord chancellor, the judges, the master and five senior breth-
ren of Trinity-houfe, the lord mayor, and three senior aldermen of London, with some of the principal officers of the
hospital. The annual average expense of each penitentiary, according to the report of the commissioners of naval
enquiry, was estimated at 27l. 10s. 6d. per man; and of the nurses, 29l. 15s. od. each; the total annual expense being 69,206l.
5s. The funds of the establishment are principally derived from a duty of sixpence per mouth, paid by every mariner,
either in the king's or merchant's service; the forfeited eftates of the earl of Devonwater; and various benefactions
from different sovereigns, from parliament, and from private
persons.

The old tower at Greenwich, built by duke Humphrey, temp. Henry VI., was pulled down in 1463, by order of
Charles II., who founded on its site the present Royal Ob-
servatory, for the purpose of ascertaining the motions of
the moon, and the places of the fixed stars, in order to
facilitate the attempts to discover the longitude at sea.

Mr. Flamsted, the first astronomer royal, began his ob-
ervations...
GREGGIES, a town in Algiers; 50 miles E.S.E. of Tiflis.

GREGARIOUS BIRDS, are such as do not live solitarily, but associate in flights or coveys, a great many together in company.

GREGARIOUS, in Greeke, is applied to such reliquia or extraneous fossils, found imbedded in the strata, as are congregated a great number of the same species together, which very commonly is the cafe, particularly in calcareous rocks.

GREGGIA, in Botany, so named by the late Dr. Sanders, in compliment to Mr. John Greg, a gentleman long resident in Dominica, the correspondent of Ellis, Garden, and other naturalists of his day. He sent many plants to Kew and other collections, and returned to England about the year 1784, dying some years afterwards, at his seat near Hampton Court. —Gartn. t. 33. (Myrtus Gregii; Swartz. Ind. Occ. 866. Ait. Hort. Kew. vol. ii. 159. Mart. Mill. Dict. v. iii.) See MYRTUS.

GREGOIE, or GREGOUC, in Geography, a small island of Africa, in the river Jaucque, about a league from the sea, on the Gold Coast, where the European nations have factories.

GREGORIAN CALENDAR. See CALENDAR.

GREGORIAN CHANT. See CHANT.

GREGORIAN CODE. See CODE.

GREGORIAN EPOCHA, is the epocha, or time, whence the Gregorian calendar or computation took place. The year 1816 is the 220th year of the Gregorian epocha.

GREGORIAN NOTES, in Ecclesiastical Music. In the Roman missals, breviaries, antiphonaries, and graduals, only four lines are used in the notation of the chants; with two clefs, the base and tenor, or those of F and C, which are removable; and two kinds of notes, the square and the lozenge; the first for long syllables, and the second for short. In some modern French missals a third species of note is used, generally at a close; this is square with a tail added to it, and is of longer duration than either of the other two. However, the Italians seldom use any other than square notes in their canto fermo, nor did the French, in their more ancient books.

These characters are not supposed to have been invented by St. Gregory, nor were they in use till many ages after his time; but since their invention, having been appropriated chiefly to the purpose of writing ecclesiastical chants in the antiphony of that pontiff, they obtained the appellation of Gregorian notes.

GREGORIAN YEAR. See YEAR.

GREGORIO DE PUERTO VIEJO, in Geography, a district and

Greenwood, a township in Cumberland county, Pennsylvania, having 724 inhabitants.—Allo, a township in Mifflin county, in the same state, containing 969 inhabitants.

Green woods, a large forest of fatly pines in Litchfield county, Connecticut, covering part of that county, and clothed in a green bearded mois, which gives to the whole a gloomy, wild, and whimical appearance.

GREENES, a river of Ireland, in the county of Kildare, which flows by the pretty town of Ballitore, and joins the Barrow; 6 miles S. from Athy.

GREENSA, a town in Algiers; 50 miles E.S.E. of Tiflis.

Greenwich, a township of America, in Hampshire county, Massachusetts, incorporated in 1754, and containing 1,460 inhabitants; 20 miles E from Northampton.—Allo, a township in Gloucester county, New Jersey, on the E. bank of Delaware river, opposite to Fort Mifflin; 6 miles S. E. of Philadelphia.—Allo, a township in Suffs county, New Jersey, on the E. side of Delaware river, in a mountainous country; 31 miles S. W. of Newton; it contained, in 1790, 2,257 inhabitants.—Allo, a town in Cumberland county, New Jersey, on the N.W. bank of Cananzy creek, about 3 miles from its mouth, in Delaware bay, containing about 80 houses and a Friends' meetinghouse; 66 miles S. by W. from Philadelphia.—Allo, a maritime and port-town in Fairfield county, Connecticut, 40 miles E. of New York, and containing 3,147 inhabitants.—Allo, a town in Washington county, New York, on the E. bank of Hudson's river. At the saw-mills of this town much buffecf is done.

Greenwich, East, a port-town, and the chief townshif of Kent county, Rhode island, distant 16 miles S. from Providence, and containing 1,775 inhabitants. It includes a meeting-house and a handsome court-house; and though its commerce is much reduced, it derives advantage from its fisheries, and sends some vessels to the West Indies. It is situated on the N.W. part of Narraganset bay. It is noted for its good cedar, and formerly raised tobacco for exportation.

Greenwood, a township in Cumberland county, Pennsylvania, having 724 inhabitants.—Allo, a township in Mifflin county, in the same state, containing 969 inhabitants.
and town of South America, in the audience of Quito, and jurisdiction of Guayaquil.

GREGORIO, St. a town of Naples, in Principato Citra; 8 miles N. W. of Cangiano.

St. GREGORIO de Ato, a town of New Mexico; 110 miles S. of Santa Fé.

GREGORIUS, in leibthology. See SALMO lavaretus.

GREGORY I. in Biographe, pope, furnaced the Great, and also dignified with the title of Saint, was a native of Rome, and born about 544 or 5. He was defended from one of the most illustrious families in that city, and was educated in a manner suitable to his rank. His proficiency in literary pursuits exceeded the most sanguine expectations of his friends; and it was said that none in Rome excelled him in grammar, rhetoric, and logic. Having left the usual routine of school learning, in the course of which he had imbued sentiments of deep piety, as well as the elementary principles of knowledge, he paid particular attention to the study of jurisprudence, which was necessary to persons who filled those stations, to which he was entitled by his birth. When he came under public notice, he discovered such abilities, integrity, and prudence, in the exercise of the different senatorial employments, that the younger Julian, who was emperor, appointed him to the honourable post of governor of Rome. In this office he acquitted himself to the satisfaction of the emperor, of the senate, and of the people. At the death of his father, he became possess of immense wealth, and being, probably from some disappointments, disillusioned with the world, he determined to embrace the religious life. He devoted the greater part of his property to the foundation of religious houses, and to charitable purposes. He founded six monasteries in Sicily, and one at Rome in his father's house, dedicated to St. Andrew, over which he constituted Valerius abbot, whom he had selected for that post from a country monastery, and to whose discipline he submitted himself. From the time of his taking the vows, he abandoned himself to meditation, devotion, and the most rigorous abstinence. He was, however, in the year 579 taken from his retreat, ordained deacon, and sent nuncio from the pope to the imperial court; the object of this mission was to apply for relief in behalf of the inhabitants of Italy, against the ravages of the Lombards. So ably did he conduct the business, that the emperor was entirely satisfied, and Gregory became one of his principal favourites: he was equally beloved by the principal courtiers, and even by the bishops, notwithstanding the jealousy which they usually entertained of a pope's nuncio. While he was at Constantinople, he had a dispute with the patriarch Eutychius, on the quiddion. Whether, after the re-erection, the bodies of the righteous would or would not be palpable. The argument was carried on in the presence of the emperor Tiberius; Gregory maintained the affirmative side of the question, to which the emperor gave his decided decision, at the same time, he ordered the patriarch to acquiesce in the judgment, and condemned to the flames a treatise of that prelate in support of the negative side of the question. In 583 Gregory was recalled to Rome, and appointed secretary to pope Pelagius, until he obtained permission to retire to his monastery. He was chosen abbot; and in that office exacted of his monks as strict an observance of rigorous abstinence and discipline, as he practiced himself. After a short exercise of the monastic virtues, he was dragged from the cloister to the papal throne, by the unanimous voice of the clergy, the senate, and the people. He alone refilled his own elevation; and his humble petition, that the emperor would be pleased to reject the choice of the Romans, could only serve to exalt his character in the eyes of the emperor and the public, and he not only confirmed the wishes of the people, but congratulated the Romans on the choice which they had made. When the mandate was proclaimed, Gregory solicited the aid of some friendly merchants to convey him in a bæcket beyond the gates of Rome, and he concealed himself a few days in the mountains, and among the woods, where he believed, or affected to believe, that he should be safe from discovery. Notwithstanding this precaution, he was in a few days found in a cave, and brought back in triumph by the people, who would not abandon their charge, till they had taken him to the church of St. Peter, where he was instantly ordained. The pontificate of Gregory the Great, which lasted rather more than six years and a half, is reckoned one of the most flourishing periods of the church; his virtues, and even his failings, were happily united to his faction, and to the temper of the times. His first step was to satisfy the bishops of the chief fees, as to the orthodoxy of his faith. For this purpose, he wrote to the patriarchs of Constantinople, Alexandria, Antioch, and Jerusalem, declaring that he received the first four councils as the four books of the holy gospel; that he reverenced the fifth, and that he condemned the three chapters. In his rival, the patriarch of Constantinople, he condemned the Anti-christian title of universal bishop, which the successor of St. Peter was too haughty to concede, and too feeble to assume; and the ecclesiastical jurisdiction of Gregory was confined to the triple character of bishop of Rome, primate of Italy, and apostle of the West. He frequently ascended the pulpit, and kindled by his eloquence the congenial passions of his audience: the language of the prophecies of the Old Testament he interpreted and applied, and he took the opportunity of improving the present calamities of the people, by directing their hopes and anxieties to the invisible word. His precepts and example defined the model of the Roman liturgy; the distribution of the parishes, the calendar of festivals, the order of procession, the service of the priests and deacons, the variety and change of sacerdotal garments. Till almost the last period of his life, he officiated in the canon of the mass, which continued above three hours at a time. Gregory was no friend to heretics; he spared no pains to arm the civil and ecclesiastical power against the Donatists in Africa, and all who favoured them. At first, he was defeated in his efforts to destroy the harmony that subsisted between the Catholic and Donatist parties in that country: he contrived to introduce invidious distinctions, which by degrees renewed the animosities by which they had been formerly distracted, and terminated in the ultimate triumph of the Catholic, which was the strongest party. Notwithstanding the zeal of pope Gregory against the heretics, he was favourable to the Jews, and protected them against some violent Chritians. In certain letters, which he wrote to the bishops who were for forcing them to embrace Christianity, he condemned perfection of all kinds in the strongest terms, though he enforced it in the instance of Chritians, who ventured to differ from the Catholic creed. On his accession to the papal throne, a general relaxation of discipline, as well as of piety and morals, prevailed in the clerical orders: he immediately set about the correction of these evils with the utmost diligence and perseverance. While Gregory was preoccupied with correction on the clergy, he set before them an example of the conduct which he prescribed. He was strictly attentive to the duties of piety: he was humble, mild, compassionate, hospitable, and disinterested, an enemy to all pomp, grandeur, and show, frequently abridging himself of the necessaries of life to relieve the indigent, and was most indefatigable in instructing his flock, both by preaching and writing.
all his humility, however, Gregory was a most zealous as- 
affor of the power and prerogatives which his predecessors 
had exercised, or at any time claimed. He would declare, 
and no one seemed to doubt the sincerity of his assertion, 
that he would rather lose his life, than suffer the fee of St. 
Peter to forfeit any of the privileges which it had ever 
 Enjoyed, or the prime apollon to be any ways injured, or rob- 
bed of his rights. In the year 593, the emperor Alitled an 
exed, forbidding any soldiers to quit the army, under the pre- 
tension of embracing a monastic life, till the time of their ser- 
vice was expired. The pope determined to remonstrate 
against this decree, being persuaded that the ecclesiastical road 
was more safe than any other to the attainment of a heavenly 
crown. For this and some other acts of interference, the 
emperor expressed his dissatisfaction with the displey taken by 
the pope, in strong and even abusive terms, and they proved 
the means of frustrating this application for a redress of 
grievances occasioned by the cruelty and avarice of the 
empire. The king of the Lombards threatened to lay siege to Rome, in order that he might avenge himself 
of some circumstance that had happened contrary to his 
dignity, but Gregory made friends with his favourites, who 
had themselves embraced the Catholic faith, and by their 
tercessions the prince was induced to draw off his troops. 
About this time the patriarch of Constantinople assumed 
the title of ‘Universal Patriarch,’ a mea sure which alarmed 
Gregory, who made every exertion to prevent him from 
making good his claims. All his entreaties were vain, the 
patriarch enforced his title, and entangled it on his suc- 
cessors. When Gregory was informed of this he denounced 
the patriarch’s commission, and condemned his conduct on 
the occasion as vain, ambitious, profane, impious, execra-
ble, anti-christian, blasphemous, informal, and diabolical. 
In the year 596, Aglulph, king of the Lombards, broke 
into the imperial territories, laying waste the Roman duke-
dom of Campania, and carrying away the inhabitants into 
captivity. On this occasion Gregory exercised the most 
unbounded charity, in relieving the poor, and redeeming 
great numbers of prisoners, not only applying the revenues 
of his fee to those benevolent purposes, but large sums which 
he obtained by his application to the bishops, and the great 
men who were his friends, both in the East and West. 
Under his reign the Arians of Italy and Spain were reconciled 
to the Catholic church, and the conquest of Britain reflects 
less glory on the name of Cæsar than on that of Greg-
ory I. Instead of six legions, forty monks were em-
barred for that dilant ifand, and the pontiff lamented the 
sufferers duties which forbade him to partake the perils 
of their spiritual warfare. In less than two years he could 
announce to the archbishop of Alexandria, that they had 
happened the king of Kent with ten thousand of his Anglo- 
Saxons, and the Roman missionaries, like those of the primiti-
ve church, were armed only with spiritual and super-
natural powers. The credulity or the prudence of Gregory 
was always dispoled to confirm the truths of religion by 
violence and pretended miracles, and he accordingly acquired 
a high reputation with his own and succeeding ages. The 
patriarch of Constantiople dying, he was succeeded by 
Cyricus, whose faith was deemed orthodox by the pope, 
but who perfidied in claiming the title ‘Universal Patri-
arch.’ Gregory still resisted, and in the course of the cor-
respondence which he maintained with the patriarchs of 
Antioch and Alexandria to interell them on his side of the 
dispute, the last mentioned prelate gave him the title of 
‘Universal Pope,’ in hopes thereby to terminate the 
difference between the contending parties. Gregory, how-
ever, rejected the title with great indignation, and by way 
of contrast to the patriarch’s conduct, he adopted the ap-
pellation of ‘Servant of Servants,’ which his successors 
have retained to this day, and affected to use it even when 
distinguished by the most flagitious exercise of pride and 
defeatism. In the year 601, at the request of Angulfus, 
the pope sent a small colony of monks into Britain, and with 
fine directions to that apostle of the Anglo-Saxons, as he 
 has been denominated, as have proved the means of intro-
ducing the gospel corrup tions and superstitions into the 
system of Christianity estab lished through his mission. 
During this same year Sereus, bishop of Maercoles, or-
dered all the images throughout his diocese to be cast out 
of the churches and destroyed; his conduct was not quite 
approved by Gregory, though he pretended to applaud 
Sereus’s zeal, in not suffering any thing to be worshipped 
that is made with hands. Nevertheless, he condemned his 
calling them out of the churches and dashing them to 
pieces, as the effect of an inconsiderate and indirect zeal, 
observing, that “though images were not set up in the 
churches to be worshipped, yet they serve to instruct the 
ignorant : and it is one thing to adorn an image, and an-
other to learn from an image what is to be adored.” During 
the year 662 a revolution took place at Constantinople, in 
consequence of the revolt of the army, at the instigation of 
Phocas, a centurion, who was proclaimed emperor, and 
obtained possession of the imperial city and throne. The 
first object of the new sovereign was to destroy the abdi-
cated prince, with his six sons and a number of his relations 
and friends, and then he got himself acknowledged lawful 
emperor in all parts of the empire. On this occasion, 
Gregory expressed his utmost satisfaction and joy at the 
change that had taken place, without hinting that he 
felt any sorrow at the means by which it had been ac-
complished. He immediately wrote letters to the new 
emperor, congratulating him on his accession to the imperial 
crown, which he said was effected by a particular pro-
vidence, to deliver the people from the oppressions under 
which they had so long groaned, and he even commended, 
flattered, and extolled the tyrant, for his justice, clemency, 
and piety, in the most fullsome terms. His object in this 
abject behaviour was that he might, by means of the in-
fluence of the emperor, defeat the attempt of the patriarch 
to assume the title of ‘Universal Bishop.’ This he plainly 
told to Leontia, the new empress, representing to her what 
bliss they might expect from St. Peter in heaven, pro-
vided they obeyed the patriarch to relinquish the title, which 
the pope considered derogatory to the honour, dignity, 
and interests of his fee. In this object he succeeded, for Phocas 
enacted a law, by which he prohibited the bishop of Constan-
tiople from flying himself ecclesiastical or general patriarch, 
declaring that this title belonged to none but the bishop of 
an ancient Rome. This was not the only instance in which 
Gregory condescended to flatter base and infamous char-
acters: he deemed equal or even greater complaisance to 
Bean haut, queen of France, who is described by Bayle as 
the most wretched woman upon earth, but as capable of 
winning over the clergy to her interest, because at the same 
time that she committed the most enormous crimes, she was 
excessively liberal to ecclesiastics, and founded temples and 
convents, not forgetting to use very devoutly for relics to 
the holy father. In all the letters which the pope wrote to 
him, he treated her with the most abject flattery, declaring 
that no nation in the world was so happy as the French, 
since it merited such a queen, endowed with virtues and fine 
qualities of every kind. In the year 684, Gregory was 
attacked with a severe fit of the gout, a disorder to which 
he had been accustomed, and which rendered him incapable
of performing the duties of his high office. Ambassadors were sent to him from the queen of the Lombards, announcing the birth and baptism of her son; he was unable to write an answer to her majesty, with regard to some difficulties which she wished to have solved, but he returned to her by her ambassador, a complimentary note, containing commendations of her zeal for the Catholic faith, and with presents to the new-born prince, of a crook to wear at his neck, in which was enclosed a piece of the true crocus, as he was pleased to affirm, together with the gospel, in a Persian box. This was one of the last acts of the pope. He died in the month of March 634. Such were the transactions of Gregory I. who, for his talents and merits, been surnamed the Great. There was, however, a strange mixture of inconsistencies in his character. In some respects he discovered a sound and penetrating judgment, but in others the most shameful and superflitious weakness. He was no friend to secular and polite learning; he has even been accused of having destroyed the noble monuments of the ancient magnificence of the Romans, left travellers and foreigners, who came to visit Rome on religious motives, by paying undue attention to them, should neglect the holy places. This accusation does not stand on undeniable evidence. It is doubted by Gibbon and other well-informed historians. "The writings of Gregory," says Mr. Gibbon, "reveal the implacable averton to the monuments of chiefe genius; and he points his fearful cenfure against the profane learning of a bishop, who taught the art of grammar, studied the Latin poets, and pronounced with the same voice the praises of Jupiter and those of Christ. But the evidence of his destructive rage is doubtful and recent; the temple of peace, and the theatre of Marcellus, have been demolished by the flow operation of ages, and a formal proscription would have multiplied the copies of Virgil and Livy in the countries which were subject to the ecclesiastical dictator." Gregory invented new offices for the services of the church, and the sacraments, in which he preferred a vast number of rites and ceremonies that were unknown before his time. He took great pains in reforming the psalms of the church, instituting an academy of choristers, whom he taught to chant, and for whose use he composed that music which goes by his name. He left more writings behind him than any other pope from the foundation of the see of Rome to the present period. These consist of twelve books of "Letters," amounting to upwards of eighty hundred in number. "A comment on the book of Job," generally known by the name of "Gregory's Morals on Job." "A Pastoral," or a treatise on the duties of a pastor. This work was held in such veneration by the Gallican church, that all the bishops were obliged, by the canons of that church, to be thoroughly acquainted with it, and punctually to observe the rules contained in it. He was author also of "Homilies" on the prophet Ezekiel; and on the gospels, and of four books of "Dialogues." His works have been printed over and over again, in almost all forms, and at different places on the continent, as Lyons, Paris, Rouen, Basle, Antwerp, Venice, and Rome. The best edition is that of Paris, in 1705, in four vols. folio. The charity and wealth of this pontiff have already been referred to: in the use of his abundant riches, he acted like a faithful steward of the church and poor. The voluminous accounts of his receipts and disbursements were kept above three hundred years in the Lateran as the model of Christian charity. On the four great festivals, he divided their quarterly allowance to the clergy, to his domestics, to the monasteries, to the churches, the places of burial, the alms-houses, and the hospitals of Rome, and the relief of the diocese. On the first day of every month he distributed to the poor, according to the season, their stated portion of corn, &c.; and his treasurers were continually summoned to satisfy in his name the extraordinary demands of indigence and merit. The diftries of the sick and helpless, of strangers and pilgrims, was relieved by the bounty of each day and of every hour, nor would the pontiff indulge himself in a frugal repast till he had sent the dinner from his own table to some objects deserving of his compassion. The misery of the times had reduced the nobles and matrons of Rome to accept, without a blush, the benevolence of the church. Three thousand virgins received their food and raiment from the hand of their benefactor, and many bishops of Italy escaped from the barbarians to the hospitable abode of the Vatican. Gregory might justly be styled the father of his country, and such was the extreme sensibility of his confidence, that, for the death of a beggar, who had perished in the streets, he interdicted himself during several days from the exercise of sacerdotal functions. Moreri. Gibbon. Lardner.

Ecclesiastical writers feem unanimous in allowing that it was the learned and active pope Gregory the Great, who collected the musical fragments of the ancient hymns and psalms as the first fathers of the church had approved, and recommended to the primitive Christians; and that he selected, methodized, and arranged them in the order which was long continued at Rome, and soon adopted by the chief part of the western church. The anonymous author of his life, published by Canius, speaks of this transaction in the following words: "This pontiff composed, arranged, and constituted the Antiphonarium and chants used in the morning and evening services." Fleury, in his Hist. Eccl. tom. vii. p. 150, gives a circumstantial account of the Sculae Centenum, instituted by St. Gregory. It subsisted 350 years after the death of that pontiff, which happened in 634, as we are informed by John Diaconus, author of his life. The original Antiphonarium of this pope was then sublimed; and the whip with which he used to threaten to scourge the boys; as well as the bed on which he reclined in the latter part of his life, when he visited the school in order to hear them praythe. Two colleges were appropriated to these studies; one near the church of St. Peter, and one near that of St. John Lateran; both of which were endowed with lands.

It has been imagined that St. Gregory was rather a compiler than a composer of ecclesiastical chants, as music had been established in the church long before his pontificate; and John Diaconus, in his life, (ib. i. cap. 6.) calls his collection "Antiphonarium Centenum," the groundwork of which was the ancient Greek chant, upon the principles of which it was formed. This is the opinion of the Abbé Lebon, (Traité Histoire et Pratique sur le Chant Ecclesiastique, chap. iii.) and of many others. The derivation is respectable; but if the Romans in the time of St. Ambrose had any music, it must have been composed upon the Greek system: all the arts at Rome, during the time of the emperors, were Greek, and chiefly cultivated by Greek artists; and we hear of no musical system in use among the Romans, or at least none is mentioned by their writers on the art, but that of the Greeks. Gregory II., pope, was a native of Rome, and educated from childhood, in the Lateran palace, under pope Sergius, who appointed him his sub-deacon, almoner, and librarian. He was afterwards raised to higher polls in the church, and was selected by pope Constantine, as the most learned man of his time, to accompany him when he went to Constantinople, in the year 710. In that city Gregory distinguished himself by answering certain difficulties proposed to him by the emperor Julianus, and solving his doubts with regard to some questions
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in which, it should seem, he was much interested, though what those difficulties were are not ascertained. Upon the death of Constantine, in 715, he was raised to the papal dignity, and almost immediately upon this event, the Lombards made an incursion into the imperial territories, and took by surprise the city of Cumae. Gregory, in his qualities of Holy Father, endeavoured to prevail on them to restore it, first by threatenings of the vengeance of heaven if they should prove so wicked as to retain it, and afterwards by the offer of a large sum of money, and the particular protection of St. Peter, provided they withdrew their troops, and abominated from all further hostilities. Finding that they were equally deaf to the threatenings and promises of the pope, he applied for the assistance of the king of Naples, who, for a stipulated sum, undertook to recover the place, and succeeded in the enterprise. In the year 717, the emperor Theodotius, having resigned the imperial dignity, and retired to a monastery, Leo, the lazaristan, was, by the Senate and army, raised to the throne, on which occasion he wrote a letter to the pope, accompanied with a confession of faith, and also with promises to maintain the Catholic doctrine, as defined by the five general councils and the fathers. Gregory, in return, congratulated the emperor, in warm expressions of respect and loyalty, upon his accession, and assured him, that he would not only receive him for his sovereign, but would use his influence to preserve peace and amity between him and all the Christian princes of the West. In 721, Gregory held a council at Rome, in which several important canons were enacted on the subject of unlawful marriages and other points relating to ecclesiastical discipline. While this council was sitting, Winifred, afterwards archbishop of Mentz, and known by the name of Boniface, arrived on a pilgrimage at Rome, where he was received with extraordinary marks of respect. A few years after this, Ina, king of the West Saxons, arrived at Rome, on a pilgrimage to the tomb of the Apostles, having resolved to renounce the world, and embrace the monastic life. During his stay in the city, he built a college for the education of youth, and the reception of such of his subjects as should undertake pilgrimages; for the support of which he imposed a tax on every house or family, known by the name of Rome-foot or Peter-pence. This tax, which, about the middle of the ninth century, was laid on the whole kingdom of England, was originally deigned solely to the charitable uses above-mentioned, but it was afterwards converted, by the popes, to their own use, and levied under the denomination of a tribute to St. Peter. Still Henry delivered the country of the burden. About the year 726, Leo, determined to restore the Christian worship to its primitive state, forbid all kinds of image-worship, and ceased the edict to be promulgated through the empire. He gave notice of the same to the pope, requesting his assistance in carrying the revolution into effect, but Gregory made no scruple of avowing his decided opposition to the measure, and threatened the emperor with the indignation of St. Peter, should he persist in his projected reform. The emperor was not to be intimidated: he published his edict in Italy, but the populace was seriously against the innovation, and insurrections were immediately excited, which thesoldiery could not suppress without much mischief and bloodshed. Lutrud, king of the Lombards, joined the popular cry, and taking advantage of the disturbances, made a rapid progress in Italy. Every where he declared his readiness to protect image-worship, and every where he was received by the people as one sent from heaven to defend the Catholic faith. These events went beyond the wishes of the pope, he was filled with the utmost consternation, well knowing that if the Lombards were suffered to make head in the Italian territories, he should feel the weight of their yoke. He applied for assistance to Ursus, the doge of Venice, which was readily granted, and which was effectual in rescuing the emperor's dominions from the power of the Lombards. Gregory purified his design, and urged Leo, by all the eloquence in his power, to abandon his plan with regard to image worship; but the determination of the emperor was inflexible, and he took measures to get possession of the person of Gregory, to prevent him from fomenting divisions, and even rebellion among the people. Gregory obtained timely notice of his intention, and frustrated the design: he immediately thundered out a sentence of excommunication against the emperor's exarch, for endeavouring to obey his master; and the people instantly took up arms, overpowered the garrison, pulled down the statues of the emperor, broke them in pieces, and openly declared that they renounced their allegiance to him as sovereign: not satisfied with this, they some time afterwards murdered all those who were adherents to the emperor's cause: and among others the exarch himself. Notwithstanding this opposition, the emperor in 730 held a council of the Senate, the great officers of the state, and the bishops who were at Constantinople, in which it was determined, that as it was found by experience that images could not be suffered to remain in churches, and idolatry prevented, they should all be pulled down and destroyed. This being effected, he made a new effort with regard to the churches in the West: he again solicited the pope, but Gregory's answer breathed a determined spirit of hostility, and was written in a style of arrogance and abuse which was unsuited. He went still further, he assembled a council at Rome, confining of all the neighbouring bishops, which ifused a decree, not only declarative of the lawfulness of worshipping images, but commanding them to be worshipped, and condemning, as heretics, all who did not worship them, or who should presume to teach that they were not to be worshipped. The emperor, indignant at this assumption of power, feizd on the rich patrimonies of the Roman church in Sicily and Calabria, tore from the Roman see the provinces of East Ilyrium, and subjected the whole to the patriarch of Constantinople. By this conduct he inflicted the most severe wound in the heart of the pope, but before he had time to ripen any schemes of revenge, he died in 731, after he had sat in the papal chair near seventeen years. From the details of his actions already given, it appears that Gregory had a zeal for exalting the power and dignity of his see; he was besides arrogant and supercilious. As an author there are fifteen of his "Letters," and a "Memorandum," transmitted to his legates in Bavaria, containing instructions for their guidance in managing the ecclesiastical affairs of that country. These are inserted in the sixth volume of the "Collectio Conciliorum;" he was also author also of a liturgy, which was printed, with a Greek version, at Paris in 1595. Moreri.

GREGORY III., pope, was a Syrian by birth, became a prebender of the Roman church, and was much celebrated for his learning and talents as an eloquent and impulsive preacher. Upon the death of Gregory II. he was unanimously chosen his successor by the Roman people and clergy. He seemed determined to follow the footsteps of his predecessor, and declared himself a determined supporter of the worship of images, and he had no sooner taken possession of his see, than he wrote a letter to the emperor Leo and his son Constantine, whom he had taken as a partner in the empire, exhorting them to renounce their error, and to return, like dutiful children, into the bosom of the church. This letter he sent by Gregory, a prebender of the Roman church, on whose zeal and firmness he thought he could depend, but when
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When the presbyter arrived, he understood that the emperors not only maintained their ground, but were determined to extirpate image-worship, and those who presumed to justify it; he therefore thought it most prudent to return to Rome without acquainting them with the object of his mission. On his arrival, the pope was so exasperated at the presumptuous conduct of the emperors which he had shown, that he called a council to determine upon some exemplary punishment, but, upon his promise of going back and executing his mission, he was pardoned. He immediately set out, but as soon as he had landed in Sicily, in his way to the imperial court, he was arrested, his letter taken from him, and he himself sent into exile. In the year 732, Gregory held a council at Rome to revenge himself upon the emperor for sending him a legate to banishment, and he procured a decree to be passed, establishing the worship of images, and denouncing excommunication against all who should presume to pull down, destroy, profane, or blaspheme them: he even expended immense sums on the purchase of pictures and statues with which he filled the churches at Rome, and encouraged the people in the daily worship of them: he likewise caused relics to be brought from all parts to Rome, where he erected a magnificent building for their reception and worship, appointing them an appropriate service, and monks to perform it. He made another unsuccessful effort towards the conversion of the emperor, who, weary of his applications, prepared to reduce the pontiff, and the Romans who supported him, to obedience by force. Upon this event, the people of Rome, at the instigation of the pope, withdrew from all subjection to the emperor, and formed themselves into a kind of republic, in which they were governed by magistrates appointed by their own authority, under the pope, not as prince, but only as their head. After this they were involved in hostilities with Luitprand, king of the Lombards, who ravaged their whole country, and even laid siege to the city. In this extremity, Gregory applied for assistance to Charles Martel, who refused to interfere till proposals were made that the pope and Roman people should solemnly renounce their allegiance to the emperor, as an avowed heretic, and persecutor of the church, and that they should acknowledge Charles for their protector, and confer on him the confessor dignity; and, on the other hand, Charles was to engage to protect and defend the pope, the Roman church, and the people of Rome, against the Lombards, and likewise against the emperor, should they either be attacked or modelled. To these terms Charles readily acceded, and as soon as Luitprand heard of the treaty he abandoned the siege of Rome, and retired to his own dominions. Gregory did not live long to enjoy the fruits of this policy, which contributed materially to the separation of the Italian provinces from the Grecian empire. He died in 741, after a pontificate of between ten and eleven years. The only literary remains of this pope are “Seven Letters,” which are to be found in the fourth vol. of the “Collect. Concil.” Morel.

Gregory IV., pope, a native of Rome, succeeded to the high office on the death of Valentine, in the year 827. He is commended for his extraordinary piety, of which some of the strongest testimonies are repairing and adorning churches and monasteries, and instituting the festival of “All Souls’” day. When the quarrel took place between the emperor Louis le Debonnaire, and his sons, Lotharius per- furred the pope to accompany him into France, to mediate a reconciliation between him and his father. When the pope had served this purpose, he was permitted to return to Rome, where the best action performed by him that we read of, was his rebuilding and fortifying the city of Ollus, as a protection against the defences of the Saracens. This pope died in 844, having presided over the Roman church about 16 years. Three of his “Letters” are extant in the seventh vol. of the Collect. Concil. Morel.

Gregory V., pope, whose original name was Bruno, was a German by birth, and a relation of the emperor Otho. He was chosen bishop of Rome when he was but twenty-four years of age; at his ordination he assumed the name of Gregory; and in a very short time after he feally crowned Otho emperor, who had before been very ill, king. He held a council in the first year of his pontificate, at which the emperor was present, and, it has been said, the German electoral college was instituted, but it is more probable, from the evidence of history, that the origin of this college is to be referred to a later date. Upon the breaking up of the council, he returned to Germany, having first made the Romans swear allegiance to him, and obedience to the pope, but fearely had the Germans repaid the Alps, when Crefcentius, a man of considerable wealth and power, perjured them to revolt, renounce their allegiance to the emperor, and choose him for their head. These events obliged Gregory to fly from Rome, on which occasion Cref- centius declared the fee vacant, and caused a person named Philagathus to be raised to it, who took the name of John XVII. Gregory excommunicated the usurper, and also his patron, a sentence which was confirmed by all the bishops of Italy, France, and Germany. Soon after this Otho, urged by the intreaties of Gregory, returned to Italy, with a large army, and advanced with the pope towards Rome. At their approach, the anti-pope John took to flight, but, falling into the hands of friends of the pope’s friends, was deprived of his flight, and otherwise cruelly mutilated. Crefcentius was also taken, and, with his accomplices, ignominiously executed. Gregory was now restored to his fee, and one of his first acts was to convene a council to meet at Rome, in which the marriage of Robert, king of France, with Bertha, widow of Odo, count of Champagne, was declared incestuous and null. He died in the beginning of 999, having left behind him many honourable testimonies of the vigilance and fidelity which he had exhibited in his office. His reign was very short; there are four of his “Letters” extant, in the 9th vol. of the Collect. Concil. A fifth, concerning the privileges of the abbots of Monfs. Major, may be found in the 4th vol. of “Baluze’s Miscellanea.” Morel.

Gregory VI., pope, whose original name was John Gratian, was defended from one of the most opulent families of Rome, and elected pope in 1044, as successor to Benedict. Upon his accession, there were no fewer than three pretenders who were pretenders to the honour of being successors of St. Peter. In this state, Henry III., king of Germany, resolved to go to Italy himself, and to inquire on the spot into the conduct of the popes, and the state of the church. He assembled a council at Sutri, in 1046, and sent an invitation to Gregory to preside at this council; with which he readily complied, flattering himself that the king would acknowledge him for lawful pope. But when he made his appearance there, a charge was preferred against him of having purchased the pontifical dignity with a sum of money. He confessed himself guilty of the charge, and, quitting his chair, divested himself of his pontifical ornaments before the council, and, begging forgiveness, renounced all claim to the throne of St. Peter. After this abdication, Henry carried him prisoner into Germany, where he ended his days. During the short time that he was at the head of the church, he performed some very beneficial acts. Finding the lands and revenues of the fee greatly diminished by usurpations, the roads infested by robbers, and other disorders pre-
vailing in the government, Gregory acted with such vigour, that a powerful party was roused up against him by those who had been accustomed to live by plunder. Moreri.

Gregory VII. pope, who, by his talents, raised the Roman fee to the highest pitch of power, is said to have been the son of a carpenter, and to have been born at the small town of Soano, in Tuscany. His original name was Hildebrand, by which he is frequently known in history. He was educated at Rome, where he was highly esteemed by Benedict IX. and Gregory VI., on the latter of whom he attended, when he was sent prisoner to Germany. Upon the death of Gregory, Hildebrand embraced the monastic life in the monastery of Cluny, where he was raised to the post of prior. By Leo IX. he was created sub-deacon, and by Nicholas II., archdeacon of the Roman church; by these pontiffs, and by some others, he was successfully employed in several negotiations. Under the pontificate of Alexander II. he was made chancellor of the holy fee, and had the absolute administration of all affairs, both ecclesiastical and civil, as well as the entire disposal of the revenues of the church of Rome. Upon the death of pope Alexander, Hildebrand appointed a falt to be kept, and prayers to be offered up for three days together, before they should proceed to the election of a new pope. While they were performing the obsequies of Alexander in the Lateran church, on the day after his death, the assembled people tumultuously cried out with one voice, "Hildebrand is pope, St. Peter has chosen him!" upon which he was immediately laid hold of and placed by force upon the pontifical throne. This election was confirmed on the same day by the whole body of the clergy and people. His next object was to obtain the confirmation of the king of Germany, which was a matter of no great difficulty, and immediately he took the name of Gregory, out of respect to his friend, Gregory VI. He was the last pope, the decease of whose election was transmitted to the emperor, or king, before his consecration, or who was consecrated in the presence of the imperial envoy. Gregory began his reign by engaging in the most bold and daring schemes for extending the jurisdiction of the Roman fee, and enriching the patrimony of St. Peter. He conceived the design, not only of emancipating the church from all subjection to princes, but of subjecting all princes to the church, and the whole church to his fee; of constituting himself supreme judge and determiner of all affairs, both ecclesiastical and civil; of disposing not only of bishoprics and archbishoprics, and other ecclesiastical benefices, but of kingdoms and states, and the revenues of individuals; and, in fact, fole and despotic monarch of the earth in temporal as well as spiritual. Gregory was from embroiled in a dispute with Henry IV., and he omitted no measures which he thought likely to strengthen his party, and, aided as he was by the superstition of the times, as well as by the resentiment of several princes, whom Henry had dishonoured, or who wished to shake off his authority, he soon created a formidable body of confederates in his support. This confederacy encouraged the pope to think of raising some other person to the throne instead of Henry, and, without hesitation, he wrote a letter to the princes, bishop, and people of Germany, empowering them to choose another king, if Henry did not, by a sincere repentance, render himself worthy of being replaced on the throne, which he had forfeited by his disobedience to the apostolic see. Upon the receipt of this letter, the confederate princes and bishops held a diet at Tribur, near Mentz, and they declared the king suspended from his royal dignity, and added, that if he did not obtain abjuration before the anniversary of his excommunication, he should be excluded for ever from the throne. Henry submitted to the degradation of preparing to throw himself at the feet of the pontiff, to solicit abjuration. He set out for Italy with his wife and infant son, and, after sustaining uncommon hardships in the passage of the Alps, amidst the rigours of an extremely severe winter, he arrived in that country. He was there speedily attended by the counts and bishops of Lombardy, who encouraged him to revenge the treatment which he had received from the pope, and offered to assist him with men and money. Gregory had, in the mean time, proceeded as far as Lombardy accompanied by the countess Mathilda, whose close intimacy with Gregory afforded too much reason for propagating many scandalous reports. Upon hearing of the king's arrival, and of the reception he had met with from his Italian subjects, the pope retired to the strong hold of Canosa, in the diocese of Reggio. While remaining in these fortress, many German bishops, and others who had been excommunicated for taking part with the king, repaired to him barefooted, clothed in hair cloth, to pray for abjuration and forgiveness, which they did not obtain without submitting to severe penance and mortification. The pontiff enjoyed the malignant pleasure of seeing the king added to the number of his humiliated supplicants. It was some time before the pontiff would admit the monarch into his presence, and when the order was inflicted for the purpose, it was on the condition that he should enter at the outer gate of the fortress without attendants; and at the next gate he was required to divest himself of the ensigns of royalty, and put on a coarse woolen tunic, in which drew, and bare-footed, he was suffered to wander for three whole days at the third gate, exposed to the severity of the weather, fasting and imploring the mercy of God and the pope. At length the persons of distinction who were with Gregory, affected at the sufferings of the king, began to complain of the severity of his holiness, which they said was more becoming a tyrant than an apostolical father or judge. These reports were carried to the pope, who on the fourth day admitted the king, and after much difficulty granted him abjuration. When the Lombard lords heard of the treatment which the king had met with, and his opprobrious convention, they were highly incensed not only against the pope, but against Henry, whom they accused of cowardice and treachery, in submitting to beg abjuration of a man whom they were determined no longer to acknowledge as their spiritual head. They deemed, at first, determined to depose him, and place his infant son on the throne; but they appeased their resentment he broke the convention with the pope, refused his title and other marks of royalty which he had laid down, and putting himself at the head of his forces, he prepared to check the pope's immediate ambition. After various successes, in which the confounding armies were alternately victorious, Henry fumoned a council of German bishops to meet at Mentz, who adjourned their sessions to Brixen, where they were accompanied by many of the Italian bishops and German and Italian princes. In this council, Gregory was accused of overfleeting the hierarchy, and making himself the monarch of the church; encouraging faction and rebellion; perfuming, excommunicating, and depoing a peaceable king, and placing a rebel on the throne. For these crimes they resolved that he should be deposed, and another chosen in his stead. Notwithstanding these measures, Gregory was able to recover himself, but he was again embroiled in new difficulties, and the Romans became incensed against the pope whom they considered as the author of the many calamities which they had endured, that apprehensions were entertained of his safety at Rome, and he thought proper to place himself under the protection
without delay for the Holy Land. He wrote also to the emperor Frederic II. exhorting him to fulfill the solemn promises which he had made to embark a sufficient army for the relief of the Christians in the East, adding the severest menaces if he should decline the undertaking, declaring that he would exert the power which heaven had put into his hands, and proceed against him as guilty of the breach of his vows. Frederic was obedient to the order. On leaving having embarked with a large army, he returned in three days, alleging that the ill state of his health rendered him incapable of so great an exertion. His excuses were not deemed valid, the pope would hear of no apologies, and passed on him sentence of excommunication, till at length the emperor embarked for Palestine, but not having found for absolution before his departure, he was still the object of Gregory's resentment, who took every method to render his expedition fruitless, and to excite civil wars in his Italian dominions. Even after the emperor had, by treaty, secured possession of the city and kingdom of Jerusalem, and was preparing for his coronation there, by the patriarch he found that the prelate had been terrified by the pastoral epistles, from taking a part in the ceremony, and had also laid the city, and the church of the sepulchre, under an interdict, that no divine service might be performed in them during Frederic's stay. The German bishops, likewise, who attended the emperor, were so much attached to the patriarch's alarms, that they refused to perform any religious functions, even to be present at the coronation; so that Frederic was under the necessity of taking the crown from the altar, and placing it upon his head with his own hands. On the emperor's return in 1229, Gregory excommunicated him again; and new causes of complaint were continually occurring between Frederic and the pope, the former being desirous of acting for himself, and the latter being fully bent upon reducing him to the most abject slavery. In the year 1241, Gregory called a general council to meet at Rome, and had sent legates with letters to all the Christian princes, entreating them to oblige the prelates in their respective kingdoms to repair to it. At first Frederic contented to the holding of the council, and promised not to molest the bishops who should attend it. But afterwards, finding that the pope was resolutely bent on his ruin, and that he intended to make use of the proposed council for this purpose, and even to arm the whole Christian world against him, he revoked his promises, and published a manifesto, which was sent through the whole of Europe, declaratory of his determined opposition to the pope's project. Nevertheless, great numbers of the bishops attended at Genoa, in their road to Rome, who, with two cardinals and all their treasure, fell into the emperor's hands, and the holy men were sent prisoners to Naples. This disappointment, together with the approach of the emperor, and his victorious army, gave such a shock to the pope, that he was seized with an illness which put an end to his life in a few days. He had been at the head of the church nearly fifteen years, which were distinguished by the calamities in which Italy was involved, chiefly owing to his immediate ambition, injustice, arrogance, and obstinacy. Many of his letters are to be found in the eleventh vol. of the Collect. Concli. Moreri. Bower.

Gregory IX. pope, whose former name was Ugozlin, was created cardinal bishop of Olbia, by pope Innocent III, and was afterwards employed on different legations to Germany and elsewhere, chiefly to preach up the necessity of engaging in the crusades. He was elected pope upon the death of Honorius III. in the year 1227, when he took the name of Gregory IX. Immediately after his consecration he commanded the western bishops to exert their authority, and oblige such persons as had taken the cross, to set out
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Gregory XI. pope, son of the count de Beaumont, and nephew of pope Clement VI. was created cardinal before he had completed his seventeenth year, and even then had accumulated upon him a number of rich benefices for the support of his new dignity. He was honoured also with other high offices in the church, while he was thus young. At this time he could have made no great progress in literary acquirements, but it is much to his credit that after his election he devoted himself to the instruction of the learned Baldi and other eminent tutors, as to become one of the ablest civilians, canons, and divines of his time. Upon the death of pope Urban V. he was chosen his successor, and was consecrated at Avignon, which was then the seat of the papal residence, in the beginning of the year 1371, when he was about forty years old. Almost as soon as he was consecrated, he sent legates to mediate a peace between the kings of France and England, and wrote to these princes, pathetically exhorting them to spare the blood of their subjects, and to compose their differences in a Christian and amicable manner; but unfortunately without succees. In the same year he erected twelve cardinals at once, and upon the election of Sicily to Frederic of Arragon, Gregory erected that island into a kingdom, on condition that the kings should do him and his successors homage. In 1374, the Florentines, having entered into an alliance with the Viconti of Milan, invaded the territories of the church, making themselves masters of several cities, and encouraging the people to throw off the papal yoke, and to refuse their liberties. Gregory's remonstrances on this occasion being fruitless, he issued out a bull of excommunication against the Florentines, which prohibited all people and nations from any communication or commerce with them; declared their estates forfeited, and the lawful property of those who should seize them. To his bull Gregory added other and still more forcible arguments to convince the Florentines of their error. He raised an army of ten thousand men which he sent under the command of the cardinal of the twelve apostles; and which was successful in stopping the ravages of the enemy. The Florentines, whole existence almost depended on their commerce, finding their traffic entirely stopped by the pope's bull, thought it prudent to make an attempt at reconciliation with the apostolic see, but the terms to effect this could not be agreed on by both sides, and hostilities were carried on with ardour, and chiefly in favour of the invaders. Gregory had hitherto resided at Avignon, though he had frequently been invited to Rome. In 1377, he arrived in that city, where he was received with great marks of joy by persons of all ranks, but the magistrates, though anxious for his presence among them, refused to give up any part of their power. Gregory having no means of establishing his authority, thought it prudent, and becoming his dignity, to withdraw to Anagni; but before he left Rome, he wrote several letters to England, against Wickliff and his doctrines, commanding the imprisonment of that worthy reformer and the suppression of his opinions. Wickliff, however, was so much respected and beloved by the English nobility, and people at large, that the bishops, to whom the pope's letters were addressed, did not dare to attempt his arrest. Towards the close of the year, Gregory, having come to some terms with the citizens of Rome, returned to that city, where he continued to receive many mortifications, which led him to the resolution of removing the papal seat to Avignon. But before he could execute his resolution he was taken off by death in 1378, after a pontificate of little more than seven years. He left behind him many letters, of which the greater part have been published by Waddingus. He is praised by his biographers.
biographers for piety, benevolence, and humanity; he was a patron of men of letters, and was himself respectable for learning, particularly in civil and canon law. He was at all times partial to his own relations, and paid more regard to their recommendation in the disposal of preferments than to the merit of the persons whom they recommended. Bowes, Moreiri.

GREGORY XII. pope, whose original name was Angelo Corario, was a native of Venice, and was preferred to the bishopric of that city by pope Urban VI. By Boniface IV. he was made titular patriarch of Constantinople, and by Innocent VII. he was raised to the dignity of Cardinal in 1495. He was now eighty years of age, and upon the death of Innocent in the following year, Angelo Corario was raised to the chair of St. Peter, and at his consecration took the name of Gregory XII. Peter de Luna was a rival candidate for the supreme honour, and assumed the name of Benedict XIII. Upon the consecration of Gregory he wrote to Benedict, and the rival competitors agreed to hold a congress at Savona in the year 1497, accompanied by their respective cardinals, with a view of restoring order in the church. It is probable that neither of them was desirous of this interview, because it was determined to use every means in their power to retain their dignities. Gregory refused to repair to the congress, though the meeting had been proposed by himself, which gave his enemies great advantage over him, his cardinals, elighted at his conduct, defected him, and withdrew to Pisa, where they published a manifesto in justification of their procedure, and an appeal to a general council, of which they sent copies to all Christian princes and states. A council was held at Pisa in March 1499, which was attended by a numerous body of ecclesiastics, and ambassadors from the kings of France, England, Sicily, &c. and after fifteen sessions it passed sentence of deposition against Benedict and Gregory, who were declared guilty of heresy, perjury, and contumacy, and unworthy of the smallest tokens of honour or respect, and cut off from the communion of the church.

Alexander V. was elected in their stead. Gregory, after some fruitless refusals, formally renounced his resignation to the council of Constance, laying aside all marks of the pontifical dignity. The council was so well pleased with his resolution that they decreed civil authority to the degree of cardinal fo long as he lived; and that he should have the precedence among the cardinals, and the title of perpetual legate of the march of Ancona. He died at Recanati in 1417, when he was ninety-two years of age. Some of his letters are extant in the eleventh and twelfth volumes of the "Collect. Com." He never was a man of thinning parts; but at the time of his advancement to the head of the church, he was highly esteemed on account of his probity, but before his death he had so completely lost his character, that no credit whatever was paid to his declarations, though made in the most solemn manner. Bowes, Moreiri.

GREGORY XIII. pope, was born of a very respectable family at Bologna, in the year 1502. He was brought up to the study of the civil and canon law, made uncommon proficiency in the pursuit, and taught the science in his native city with uncommon reputation for more than eight years. When he was about twenty-eight years of age, he took his degree of doctor, and was afterwards appointed judge of the court of commerce at Bologna, erected for the trial of mercantile causes. He resided for some years in Rome, was admitted into the church, obtained considerable preferment, and on the death of Pius V. in 1572, he was unanimously elected his successor, and at his consecration he took the name of Gregory XIII. The most important event in the pontificate of Gregory, was the reformation of the calendar, according to a method suggested by Lewis Lilio, a Calabrian astronomer, which concluded his death was presented to the pope by his brother. This method, which is fully explained under the word Calendar, and referred to in diverse other articles in our work, was immediately adopted in all Catholic countries, but was rejected by the Protestants, and by the Greeks, who chose rather to remain in error, than be indebted to the pope for the knowledge of the truth. In 1584, Gregory incurred the suspicion of having encouraged the assassination of Elizabeth queen of England, by Parr, an English Catholic, who was detected in a conspiracy against the queen's life. There was, however, no direct proof of Gregory being at all privy to the scheme. This pope contributed greatly to correct and amend the calendar, and he enriched with learned notes. A short time before his death, he received ambassadors from the islands of Japan, where the labours of Xavier and other Jesuits were said to have been crowned with abundant success. The ambassadors had a most flattering reception given them, and great regaleings were ordered to be made in the name of the pope, in account of the person which he appointed to open, of triumphs to the Catholic faith in a rich and populous empire. In the midst of these rejoicings Gregory was seized with a quinsy, which carried him off in the 84th year of his age, and the 14th of his pontificate. Several of his "Letters," "Harangues," &c. are said to be in existence, and preferred in the cabinets of the curious. He was much beloved by the Romans on account of the mildness of his government, which, by degenerating into weakness, gave occasion to numerous irregularities, and an almost general corruption of manners in the ecclesiastical state. He was a zealous friend to the Jesuits, to whom he granted many privileges, and built for their use, and richly endowed, the Roman college, and nearly thirty other seminaries in different parts of the world. Bowes, Moreiri.
Gregory XV., pope, descended from a noble family at Bologna, and named before his election, Alexander Ludovisi, was born in the year 1554. He was educated among the Jesuits at Rome, and then returned to Bologna, where he studied the civil law, and took his degree of doctor in that faculty. Having attained this literary honour, he went back to Rome, where he acquired the friendship of three popes, viz. Gregory XIV., Clement VIII., and Paul V. of whom the last appointed him archbishop of Bologna, and put him out as nuncio to adjust some differences which had taken place between the Spaniards and the duke of Savoy. For his able conduct in this difficult business he was promoted to the rank of cardinal. On his return he refereed on his diocese till the death of his patron Paul, in 1621, when he went into concile with the other cardinals, and was almost unanimously chosen pope, and assumed the name of Gregory XV. Where his own particular sentiments were not immediately concerned, he was a man of mild manners and very human disposition, but the whole of his papacy was marked with a violent excess of zeal and bigotry against the Protestants. As the Hugonots of France had, by the violation of the edict of Nantes, been driven to take up arms in their own defence, he wrote to Lewis XIII., exhorting him, by every argument in his power, to destroy or extirpate them; and to prove the extent of his zeal, he accompanied the letter with a bull, intended to animate the Papists in their flagitious and savage undertaking. He next published a bull, preferring a new form in the election of a pope, by which the cardinals were allowed to give their suffrages freely, by way of suffrity, by which he intended to prevent the chiefs of parties from having so great an influence in future elections. As a politician, he supported, to the utmost of his power, the emperor Ferdinand II. and Maximilian, duke of Bavaria, against the elector palatine of the Rhine, fon-in-law of James I. of Great-Britain: by his aid they were enabled to obtain the palatinate, an event that gratified him as well by the injury which it did to the interests of the reformed religion in Germany, as by the share which it gave him in the spoils of the valuable library of Heidelberg, a part of which was transferred to the Vatican. He also attempted the destruction of Calvinism, by endeavouring to persuade Lewis XIII., to allow the duke of Savoy to feize upon Geneva, the nursery of that system; but in this object he was disappointed. He was likewise unsuccessful in an attempt which he made to re-instate the Jesuits at Venice, from whence they had been banished during the pontificate of Paul V. In 1622 the Turks invaded Poland with a formidable army; to re-secure their power, Gregory sent immense supplies of money to Sigismund, by which he was enabled to withstand the barbarian power, and finally to gain a signal victory over them. About the same time the pope instituted the famous college, "De propaganda fide," and endowed it with ample revenues for the maintenance of professors to be educated for foreign missions. Gregory endeavoured to turn his own purpose the intended marriage between the princess of Wales, son of James I., and the infanta of Spain; he refused to grant a dispensation for the marriage, but upon very severe conditions, to all which James seemed willing to submit, when the affair was suddenly stopped by the pope's death, which happened in 1623, after he had filled the papal see about two years and a half. He was the author of some literary productions, which have been lost, likewise of "Epilola ad Regem Perfarum Sech Abbas cum notis H. galfoni," and "The Decision of the Rota." He is highly commended for his piety and great learning, particularly in canon law, and for his charity to the sick and poor. He was, in a certain degree, the encourager and patron of learning, and when his nephew, cardinal Ludovisi, had formed a kind of literary academy in his palace, he was frequently present at their meetings, and did all in his power to promote the extension of science and useful learning. He was a great friend to the Jesuits, and canonized their founder, Francis Xavier, and by him the see of Paris was withdrawn from jurisdiction to that of Sens, and erected into an archbishopric. Morei. Univer. Hist. Bower. Gregory of Neo-Cæsarea, surnamed Thaumaturgus, or Wonder-worker, from the miracles which he pretended to perform, was born at Neo-Cæsarea, in Pontus, and flourished in the third century; he is usually styled a saint, and was, known, before his conversion to Christianity from Paganism, by the name of Theodosius. His father was a zealot for the principles in which he educated his son, but he caused him to be instructed in the elements of useful and ornamental learning. He provided for him the most able tutors, one of whom earnestly recommended to his pupil the study of the Roman law, as what might be highly advantageous to him in future life. With this advice he complied, and made himself master of the principles of the science. Having laid the foundation of learning at home, he set out upon his travels. In Phœnicia he endeavoured to improve his knowledge of law under the celebrated professors of that science who refided there. He had a filler married to a lawyer in high esteem with the governor of Palentia, and chosen by him to be one of his counsellors. This lady was sent for by her husband to Cæsarea, and as the officer who came to escort her brought with him a greater number of carriages than were sufficient for her and those who would attend her, Gregory was induced to make one of the party. At Berytus he attended a school of philosophy lately opened by the celebrated Origen. For five years Gregory and his brother were disciples of this great master, who instructed them in logic, physics, geometry, astronomy, and ethics. He encouraged them in reading all sorts of ancient authors, poets, and philosophers, whose tenets were not sceptical. He restrained them only from such as denied a deity, or a superintending providence. It was during their attendance upon Origen that they became enlightened and zealous Christians; he introduced them to a knowledge of the sacred scriptures, and explained to them the passages which to their minds might appear obscurer and difficult. About the year 239, Gregory returned home; he took leave of Origen with great regret, but not before he had pronounced before a numerous auditory a panegyrical oration in praise of his tutor, which is extolled by Dupin as one of the finest pieces of rhetoric in all antiquity, and which affords at once a proof of the writer's eminent abilities, and of Origen's excellent method of educating those who were placed under his tuition. The tutor was attached to his pupil, and after his return to Neo-Cæsarea, he wrote to him a letter, intending, no doubt, that he should make what use he pleased of it, commending his excellent parts, which, he said, qualified him either to become a Roman lawyer of the first rank, or a philosopher of eminence among the Greeks, but he could rather wish that he would employ his great talents in the service of the Christian religion, which might better advantageously serve his exertions. His celebrity led many to sollicit him to open a school of philosophy in his native city, but a difference in himself led him rather to withdraw from public notice. He was next urged to undertake the office of Christian bishop, an application which he refiled a long time, though, at length, he was induced to accept the charge, and was ordained, according to Dr. Lardner, by Phœbus, bishop of Amasea, about the year 245. He was recommended to give all his exertions to his native city, which was large and populous,
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populous, but immered in superficiality and idolatry, and contained but very few Christians. By his great zeal, united to much prudence, he made numerous converts to Christianity, and established a church which is said to have been truly apostolic, both with respect to doctrine and discipline, and to have retained its purity, long after surrounding churches had admitted novelties and innovations which were a departure from their religion, and infensibly led the way to the grossest corruptions and abuses. This church went on flourishing and increasing under his care till the Decian persecution, in the year 250, when he thought it prudent to withdraw into retirement till the storm was blown over. He afterwards returned to his flock, among whom, during the remainder of his life, he discharged the duties of a faithful and vigilant pastor, and was instrumental in bringing not only the whole city, but the dependent district into the profession of Christianity. He was present at the first council at Antioch, in 264, when the case of Paul of Samosata was the subject of enquiry, and Gregory, with others, exerted themselves in preventing any harsh measures from being adopted against him. He is thought not to have long survived the meeting of this council, and to have died some time in the year 265. Upon the whole he was a great and good man, eminent for purity and simplicity of manners, zealous for the interests of the Christian faith and profession, and anxious to preserve them undaunted with superficialities and practices. The only works of his that are extant, which are unquestionably genuine, are his "Oration in Praise of Origen," and "A Paraphrase on the Book of Ecclesiastes." "A Canonical Epistle," consisting of eleven canons, is ascribed to him by some authors, but it is rejected by other very able and learned critics, and is considered to have been added by some modern Greek. His pieces have been frequently printed; they were collected into one volume at Paris, in 1626; and Gerard Vosius published an edition of them at Mentz, in 1604, in 4to. Dr. Lardner says there are two things to be lamented, 1st. That no more of this excellent man's writings have come down to us. It is plain that some of his writings are lost; for Jerom speaks of his epistles, whereas there is only one remaining. And B Alf mentions an "Exposition of Faith," or a "Dialogue with a Gentle," which is not now in existence. 2dly. That we have no history of his life, written by some contemporary. It may be well supposed that this apostolical man was chiefly employed in increasing his church, or in building it up in knowledge and virtue, by oral instructions and works of goodness. His church continued itself in the faith after his death, and near the end of the fourth century the Neo-Cæsarians were all Christians, having been all along to that period blest with pastors who were men of true worth. As Gregory, therefore, was an honour and ornament to the churches in his time, so his church continued to be an ornament to him. Lardner's "Christian" vol. 2. p. 368.

GREGORY NAZIANZEN was born near Nazianzum, in Cappadocia, about the year 324. His father was not brought up a Christian, but, by marriage, became a convert to the true faith. His learning, piety, and many virtues, pointed him out as a proper person for filling the episcopal character, and he was accordingly ordained, and appointed to the see of Nazianzum, where he officiated as pastor for the space of forty-five years. Gregory afforded only proofs of excellent natural abilities, and a serious turn of mind, and having made great proficiency at home, he was sent, for farther improvement, to different public seminaries of learning. He was first placed at Caesarea, in Cappadocia, whence he removed to Caesarea, in Palestine; thence to Alexandria, and proceeded from that city to Athens, where he intended to finish his academical studies. At the last named city he became acquainted with Balfi, celebrated in the church, and likewise with Julian, who was afterwards emperor. With the former he entered into the frictious habits of friendship. They lived together in the same house, united in the same studies, and embraced the same tenets in religion. Having been a considerable time at Athens, he felt a strong desire to visit his friends at home, and set out for Constantinople, on his journey homewards. At that city, he met his brother, Caesarius, who had just returned from Alexandria, and here he was strongly urged to settle, but by the influence of Gregory he declined all the flattering offers made him, and returned with him to Nazianzum. Gregory, on his return, was baptized, being about thirty years of age, and from this period he seems to have chiefly devoted himself to a studious and ascetic life, prafticing the austerities of monstery, and mixing no further in the business of the world than was necessary for the management of his father's concerns. In the year 359, he visited Balfi, in his retirement among the mountains of Pontus, and subjected himself to the same severe discipline which he preferred. He had not long enjoyed the company of Balfi, when he was sent for in haste to allay a ferment that had occurred in the church of Nazianzum. He succeeded in reconciling the differences that had occasioned the discontent; entered into orders; and was ordained presbyter. Julian, the avowed and malignant enemy of the Christians, had now ascended the throne: he published a law intended to prevent the adherents to the gospel from being instructed in the arts and sciences, hoping to render the followers of Christ barbarians; but this effort was partly defeated by the two Appollonarii; and Gregory, who wrote a number of poems in all kinds of verse, on divers serious subjects, by which the lips of the Greek and Roman classics was in some degree compensated to Christian students, on account of their excellencies and beauties as compositions. Gregory officiated for some years as assistant to his father in the pastoral office. In this situation he was instrumental in promoting the election of his friend Balfi to the see of Caesarea, in the year 370, a circumstance, though well meant by Gregory, which had nearly occasioned a rupture between the two friends; and which determined Gregory to withdraw into retirement, where he hoped he might be allowed to spend his life in study and religious contemplation; but by his father's earnest entreaties he was induced to become his coadjutor in the episcopal office at Nazianzum, on the express condition, that after his father's death he should be perfectly free from all obligation to that charge. Accordingly when this event took place, in the year 374, he quitied Nazianzum, and retired to Sclencia, where he continued for a long time in a monastery before he returned to his native country. About the year 378 Gregory, among others, was deputed, on account of his great learning, to go to Constantinople to afford in defending the Catholic cause against the Arians, who were making head against them. When he arrived at the city he found the Catholic cause reduced to the lowest ebb, so that the Catholics themselves durst scarcely venture to avow their opinions. At first he only preached in a private manner at his lodgings, but in a short time the fame of his eloquence brought multitudes to hear him, and he converted the house in which he was into a church; to this he gave the name of Anastasia, or the Resurrection, because the Catholic cause seemed to have its resurrection in this particular spot. His discourses excited the jealousy of the Arian party, who instigated the populace to attack him and his friends with clubs and stones, both in the streets and at
his church. Gregory they dragged like a malefactor before the magistrates, accusing him of being the cause of tumult and sedition, but he was acquitted of all malice, and the persecution by which he experienced served only to increase the number of his followers. His great celebrity attracted difficulties from distant parts, among whom was St. Jeron, who frequently boasted of having had the honour and happiness of studying under such a master. The Catholics were now sufficiently strong in number to desire the re-establishment of the episcopal office among them, and expressed their unanimous wish that Gregory would undertake it. He met with a rival in Maximus, an Egyptian Cynic philosopher, whom he had himself baptized, and admitted to the lower orders of the church. This perfon contrived a scheme for supplanting him in the episcopal throne by intrigue and boldness, and engaged some of the Egyptian bishops to favour his views. Gregory, on account of ill health, was obliged to quit the city for the sake of the country air, and the confederates, unwilling to lose any time, during the first night of his absence broke into his church, and placed Maximus upon the throne. The great body of the people of all classes and parties in religion were indignant at this conduct; they assembled, and with the utmost fury drove the intruders out of the church, who were now obliged to consult their safety by flight. This attempt to supplant him produced much uneasiness in the breath of Gregory, and made him very desirous of retirement, and after a time he determined to resign a charge which involved him in increasing troubles. He accordingly announced his intention to his people in a farewell discourse, in the course of which he pathetically exhorted them to persevere in the orthodox faith which he had taught them, and to be mindful of the labours and sufferings which he had undergone for that cause. No sooner had he finished his exhortations, than he was surrounded by persons of all ages, sexes, and qualities, who were to earnest in their entreaties that he would remain, that, at length, he promised not to defect them till the eastern bishops, who were expected soon to assemble at Constantinople, should relieve him by choosing a more worthy person to occupy his place. About this period Theodorus the Great was created a partner in the imperial throne, and in a short time felt the support of the orthodox faith; he issued an edict, commanding all his subjects to receive the Catholic doctrine of the Trinity under the heavy penalty of being treated as heretics and infamous persons. In the year 380 he came to Constantinople, where he treated Gregory with the greatest kindness and respect, and told him that God had sent him to give him possession of the church, which he was ready to deliver up into his hands as a reward of his labours. A day was appointed for his installation, but, at Gregory's request, the ceremony was deferred for the present, and soon after having obtained the emperor's consent, he abdicated his episcopal throne, and retired to his paternal estate, near Nazianzum, with the resolution of spending the remainder of his days in studious retirement, and the exercises of devotion. In 382, however, Gregory was summoned to meet the eastern bishops at Constantinople, but he refused to attend, and told the fathers very plainly that experience had taught him how little good was to be expected from any such assemblies, in which pride and ambition chiefly predominated, and which were rather calculated to widen than to conclude differences among Christians. Upon his return to his native country he was strongly importuned to undertake the charge of the see of Nazianzum, which had continued vacant from the time of his father's death, but he could not be prevailed upon to quit his retirement, where he died in the year 389, supposed to be about the age of sixty-five years. He was, in many respects, a great and a good man, and an ornament to the age in which he lived. His piety was ardent and sincere, though not unaccompanied with superfluous, and his morals strict and regular, but partaking too much of the severity enjoined by monastic institutions. His benevolence and charity were boundless, and they led him to devote the whole of his income to the relief of the poor and afflicted. The works of this father consist of "Sermons," "Letters," and "Poems." They were first published at Basli in 1550 in Greek; but the best edition of them was published by Morel, in two volumes folio at Paris 1659. By Dupin he is clasped with the most perfect orators of Greece, yet he admits that his style had too many antitheses, similitudes, and other rhetorical embellishments, which sometimes render his oratory effeminate. Erasmus says that he was discouraged from attempting the translation of Nazianzen's works, on account of the acumen and fine parts of his style, the grandeur and sublimity of the matter, and the obscure allusions which are frequently intermixed among his writings. Moreri. Dupin.

Gregory, furnish'd Nymph, a faint and father of the church in the fourth century, was a younger brother of St. Basil, and born at Cappadocia about the year 322. He was originally intended for the ecclesiastical life, though for some time he practised as a professor and philander, with great success and applause. At the persuasion of Gregory Nazianzen, he was induced to relinquish his secular pursuits, and to apply with great diligence to the study of theology, and whatever was connected with it. As soon as he had taken orders he became so eminent in the pulpit as he had formerly been at the bar. About the year 372 he was ordained bishop of Nyssa, in Cappadocia, by his brother Basil. He became distinguished for his opposition to the Arian party, and on that account was banished by the emperor Valens two years after his ordination. On the death of that emperor, he was recalled by Gratian, and referred to the polliion of his episcopal see. In the year 378 he was present at the synod held at Antioch, and on his return he paid a visit to Jerusalem, in the hopes of gratifying his wishes in viewing the scenes of Christ's ministry, death and resurrection, and the sanctuaries which existed among Christians in that city. Instead, however, of finding the virtues which might have been expected from the inhabitants of the Holy Land, he found "the place to be a sink of iniquity and debauchery, the seat of envy, malice, adultery, robbery, idolatry, poisoning, and bloodshed, where men afflict each other for a trifling reward, so that in no place were murders so frequently and so easily committed." In 381 he was summoned to the council that met at Constantinople, and to him was confided the task of drawing up a creed, which was adopted, and is the same as that which has been received into the English liturgy, under the name of the Nicene Creed, excepting the words "and the Son," in the part relating to the Holy Ghost, which were added at a later period. He was engaged in other councils, and his name appears in the bills of the prelates who were present at the synod held at Constantinople in the year 544. It is not certain how long he lived after this period. He had entered into the marriage state early in life, and continued to live with his wife after he had been advanced to the episcopal rank. His works, which consist of commentaries on different parts of the scriptures; controversial treatises; sermons and funeral orations; biographies of distinguished persons, letters, &c. are many of them more like the treatises of Plato and Aristotle, than those of other Christians. Moreri.
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GREGORY, GEORGE FLORENCE, commonly known by the name of Gregory of Tours, was born about the year 544. He was educated for the ecclesiastical profession, was a proficient in the learning of the times, and acquired considerable reputation by his talents as a preacher. Being attacked by a dangerous illness, he paid a religious visit to the tomb of St. Martin at Tours, which procured the occasion of his dedication to the nobility, clergy, and other inhabitants of that city, whose good opinion was conciliated by his behaviour among them. So strong was his impression made in his favour, that on the death of Etupomis, bishop of Tours, in 573, he was unanimously elected his successor. In the year 594 he took a journey to Rome, to visit the tombs of the Apostles, and to pay his respects to pope Gregory the Great, who received him with extraordinary marks of esteem. He died soon after his return to his diocese, in 595, when he was in the fifty-second year of his age. He was author of "The History of Franks;" "The Lives of the Saints;" "Fragments of a Commentary on the Psalms," and other pieces. The style ad language of the history are harsh and indelicate, but it supplies the historian with facts which serve to fill up the chains in the annals of the dark ages, and which carry with them strong internal marks of authenticity. The best edition of Gregory's works is that published at Paris in 1669. Moreri. Du Plan.

GREGORY of Rimini, one of the most subtle schoolmen in the 14th century, was born in the city whence he took his surname. He became a monk of the order of the Hermits of St. Augustin, and taught with great applause in the university of Paris. He was made general of his order at Montpellier in 1357, and died in the following year at Vienna. As an author, he is known by "Commentaries on the Four Books of Sentences;" "Commentaries on the Epistles of St Paul;" and "On the Epistle of St. James," by "A Treatise on Ufurry;" "Sermone;" &c. Moreri. Bayle.

GREGORY St. Vincent, a Flemish mathematician, was born at Bruges in the year 1524. He studied mathematics under Clavius, and became a member of the society of Jesuits at Rome. He acquired a very high reputation in the sciences, was chosen to some high offices, and was elected by Philip II., king of Spain, to be mathematical tutor to his son, prince John of Austria. He died at Ghent in 1667, at the age of eighty-three. He is known as author of three learned mathematical works, of which the principal is entitled "Opus Geometricum Quadrature Circuli, et Seclution Coni, decem Libris comprehensum," 1647, in two vols. folio. In this work he shews, that if one asymptote of an hyperbola be divided into parts, in geometrical progression, and from the points of division ordinates be drawn parallel to the other asymptote, they will divide the space between the asymptote and curve into equal portions. Moreri.

GREGORY, JOHN, a learned English divine, was born at Agmonleham, Bucks, in the year 1667. He received a good education, and was placed in the quality of fervitor to Christ-church college, Oxford, in 1624, where he was under the tuition of Dr. George Morley, afterwards bishop of Winchester. In this college he took his degrees, and was appointed one of the chaplains. In the year 1634 he published a second edition in quarto, of Sir Thomas Ridley's "View of the Civil and Ecclesiastical Law," with notes: by this work he acquired a high degree of reputation, on account of his deep and extensive learning, and the skill which he shewed in ancient and modern languages, Oriental as well as European. He obtained some considerable pro- ferment in the church, particularly a prebendary in the see of Salisbury. This he did not long enjoy, owing to the civil wars, in which our author was an active partisan of the royalists. Being now much reduced in his means, he took up his abode at an obscure ale-house near Oxford, where he remained in great privacy, devoting all his time to literary pursuits. He died before he had arrived at his fortieth year; he led, however, attained to the favour and correspondence of many of the greatest men of his age. In 1646 he published "Notes and Observations on some Passages of Scripture," which were afterwards included in the "Critici Sacri." In the year 1650 a collection of his learned tracts was published in quarto, under the title of "Gregorii Potentulae;" he left behind him three translations from the Greek into Latin, which were published in 1665, by Edward Byde, esq. in his own name. They are entitled "Palladius de Gentibus Indice et Brachmanniis;" "S. Ambrosii de moribus Brachmannorum;" and "Anonymi de Brachmanniis." Biogr. Brit.

GREGORY, JAMES, one of the most eminent mathematicians of his age, was born at Aberdeen in the year 1648. He was educated at the grammar school of his native town, and went through the usual course of academical studies in the Marischal college, with credit and reputation. He soon discovered a great turn for mathematical pursuits, and began, at an early age, to make improvements in the science of optics. He published, in 1665, a work entitled "Optica Promota, seu abditata Rationem Reflexorum et Reractorum Mysteria, Geometrica emuncta," &c. quarto. This work, which gave an account of the invention of the reflecting telescope, which will be described in the article Telescope, immediately attracted the notice of mathematicians in all parts. About the year 1664 or 1665, Mr. Gregory came to London in order to get his instrument executed by some able hand; but being disapponted in his object, he laid aside his telescope, and went to Italy, where he resided some years. In 1667 he published at Padua "Vera Circuit et Hyperbolae Quadratura," &c. quarto, in which he announced another of his discoveries, that of an infinitely converging series for the areas of the circle and hyperbola, by which they may be computed to any degree of exactness. He sent home a copy of this work to Mr. John Collins, who communicated it to the Royal Society, where it met with much commendation. Another work, which he published in the following year, was entitled "Geometria Pars Universalis, infirmissum Quantitatum Curvarum Transformationi et Mensura," in which he shewed a method of the transformation of curves. These works procured the author the correspondence of Newton, Huygens, Halley, Wallis, and other most eminent mathematicians. Mr. Gregory was now chosen a member of the Royal Society, and upon his return from his travels he communicated to that learned body an account of the controversy carried on in Italy concerning the motion of the earth. About the year 1668 he was appointed professor of mathematics in the university of St. Andrew's, an office which he held for six years; and in 1674 he was called to Edinburgh, to fill the mathematical chair in that university; this situation he held but little more than a year, when, in the month of October 1675, being employed in shewing the satellites of Jupiter through a telescope, he was struck with a sudden and total blindness, and died in the course of a few days at the early age of thirty-seven. Mr. Gregory possessed an acute and penetrating genius; he was unambitious, and contented with the advantages of his situation as professor, which conduced to the only pecuniary reward of his eminent talents. Besides the discoveries already noticed, he invented and demonstrated geometrically, by the
help of an hyperbola, a converging series for making logarithms, which is recommended by Dr. Halley for practical purposes: he sent to Mr. Collins the solution of the famous Keplerian problem by an infinite series; he discovered a method of drawing tangents to curves geometrically, without any previous calculation, and many other things which shew that the most brilliant part of his character was that of his mathematical genius as an inventor.

Biog. Brit.

Gregory, David, nephew of the preceding, an able mathematician, was born at Aberdeen in the year 1661. He was the eldest son of Mr. David Gregory who had the singular fortune to see three of his four all professors of mathematics, at the same time, in three of the universities; one, David at Oxford, his second son James at Edinburgh, and his third son Charles at St. Andrews. David, the subject of this article, received the early part of his education at his native place, but completed his studies at Edinburgh, where he took his degree of A.M. and so greatly did he distinguish himself in scientific pursuits that he was elected professor of mathematics in that university, when he was only in his twenty-third year. About this period he published from his uncle's papers, with considerable additions of his own, "Exercitatio Geometrica de Dimensione Figurarum, five Specimen Methodi generalis diemiendi quaesis Figurarum." He soon received the excellence of the Newtonian philosophy, and was the first who had the merit of introducing it into the schools by his lectures at Edinburgh. In this city he remained as mathematical professor with distinguished honour and applause till the year 1691, when hearing of Dr. Bernard's intention to resign the Savilian professorship of astronomy at Oxford, he went to London, and was introduced to Sir Isaac Newton, who, perceiving highly of his talents, recommended him to be chosen a fellow of the Royal Society. Newton introduced him to the notice of Mr. Flamstead the astronomer royal, and with his recommendations he was elected Savilian professor, though Mr. Halley was a competitor. Their rivalry laid the foundation of a permanent friendship between these eminent men, and Halley afterwards was the colleague of Gregory, by obtaining the professorship of geometry in the same university. In 1695 he published the substance of his optical lectures which had been read at Edinburgh. This work was entitled "Catoptrice et Dioptrice Sphericae Elementa," 8vo. Dr. Gregory, in 1697, gave a demonstration of the Catenarian curve, or that curve which is formed by a chain fastened at each end. The paper on this curve was printed in the "Philosophical Transactions," and also in a work of much reputation, entitled "Miscellanea Curiosa," as one of the noblest discoveries that had at that time been presented to the Royal Society. The most celebrated work of this learned professor appeared in the year 1701, entitled "Afronomica Physicae et Geometricae Elementa." This was written chiefly with the design of explaining Sir Isaac Newton's geometry of the centripetal forces, as far as his discoveries in astronomy are built upon, and to throw the astronomical part of his Principia into a new and more intelligible form. It was afterwards translated into English, of which the second edition was published in 1726, in two volumes octavo, entitled "The Elements of Physical and Geometrical Astronomy, &c." This impression was revised and corrected by Mr. Stone. In 1703, our author published a splendid folio edition of the works of Euclid in Greek and Latin. He now began to prepare, in conjunction with Dr. Halley, a new edition of "Apollonius's Conics," but he had not proceeded very far in the undertaking before he was cut off by death in 1710, when only in the forty-ninth year of his age. Besides the works of Dr. Gregory printed in his lifetime, two others were published after his decease; one "A Short Treatise on the Nature, &c. of Logarithms," printed at the end of Dr. Keill's translation of Commandeur's Enchuf; and the other "A Treatise of Practical Geometry," published by Mr. Macaulin in 1745.

Gregory, James, brother of the preceding, rose to high eminence as a mathematician. He succeeded his brother in the professorship of mathematics at Edinburgh, which office he held thirty-three years with great reputation, and retiring in 1725, was succeeded by the celebrated Macaulin. Charles, the other brother, was created professor of mathematics at St. Andrews, by queen Anne in 1707. This office he held with great credit thirty-two years, when he resigned in favour of his son David, who succeeded him in 1739. He died in 1756. He published a compendium of arithmetic and algebra in Latin, entitled "Arithmetica et Algebra Compendium, in Usum Juventutis Academicarum," Edin, 1736. Biog. Brit.

Gregory, Dr. George, was a native of Ireland, but at the death of his father, who was a clergyman, and a very elegant scholar, the subject of this article was brought to Liverpool, by his mother, who was a native of Lancashire, where he received the elements of a learned education, which he completed at Edinburgh. He took orders in the church in 1778, and was made at Liverpool till the year 1782, when he removed to London, and obtained the curacy of Cripplegate. In 1785 he became known as the author of a volume of "Elia's," which had an extensive sale, and went through several editions; and in 1789 he published a translation of Lowth's lectures on "The Sacred Poetry of the Hebrews," which was well received by the public. In the year 1784 he was preferred, through the interest of lord Sidmouth, by his majesty, to the living of Wellham, in Essex; he had previously to this obtained marks of distinction from the bishop of London, which, however, were attended with very full portions of emolument. Dr. Gregory did not long live to enjoy the ease and independence which his noble friend intended, by the presentation of the living of Wellham; he died March 13, 1808. Besides, the works already mentioned, he was author of a volume of "Sermons," of the "Economy of Nature," in three volumes; of a "Letter on Literature," in two volumes, and was likewise the editorial superintendent of an "Encyclopaedia of Arts and Sciences," in two volumes. He was author of a Church History in two volumes, 8vo.; and of the life of Chatterton, for whose fate he felt the most sincere commiseration, and divers other works with and without his name. Monthly Magazine.

Gregory, John, an eminent physician, and professor of the practice of physic in the university of Edinburgh, was born in May, 1725. His father was professor of medicine in King's college, Aberdeen; and his grandfather was professor of mathematics, first at St. Andrews, and afterwards at Edinburgh. Thus Dr. Gregory was the third professor of his family in a legal descent; and distinguished to be reckoned, that, from his great-grandfather, David Gregory, esq. of Kimairly, he was the fifteenth descendant who had held a professorship in a British university: his son now fills the same chair at Edinburgh.

John Gregory began the study of medicine at Aberdeen, and afterwards proceeded at Edinburgh, Leyden, and Paris. In the 26th year of his age, he was elected professor of philosophy in King's college, Aberdeen, and had at the same time the degree of doctor of medicine conferred upon him. In the year 1756, upon the death of his brother, Dr. James Gregory, who had succeeded his father as professor
Professor of medicine, he was elected to that chair. But about the year 1755, he left Aberdeen, and went to Edinburgh. Soon after this he was appointed professor of the practice of medicine in the university there, in the room of Dr. Rutherford, who resigned in his favour. The year following, upon the death of Dr. White, he was nominated first physician to his majesty for Scotland. Thus at the time of his death, which took place on the 10th of February, 1773, besides very extensive practice, he enjoyed the highest and most important professional offices, which his native country could afford him.

His first publication, entitled "A comparative view of the state and faculties of men with those of the animal world," made its appearance in 1765. This production combines many just and original reflections, with a liberality of sentiment seldom equalled. It went through four editions in two years. In the year 1770, a second work of Dr. Gregory made its appearance; but without his consent, and even contrary to his inclination. This publication was made from a short-hand manuscript taken at his introductory lectures on the practice of physic, and was entitled "Observations on the duties and offices of a physician, and on the method of professing inquiries in phlebology." Although this production contained much valuable matter, that, had it appeared in a much worfe dress, it could have done him no different, yet he was disfurnished with its form; and, therefore, he soon after published an edition of it himself, in which his former sentiments were propounded with all the advantages of a correct and elegant style. His last publication, "Elements of the Practice of Physic," was intended as a syllabus to his lectures; but he only lived to complete his account of the diseases usually termed febile.


Gregory Bay, in Geography, a bay in the fruited of Magellan, on the S. coast of Patagonia.

Gregory's Island, four small islands in the Mergui Archipelago. N. lat. 10° 36'.

Gregory's Sound, a passage between two of the south isles of Arran, on the western coast of Ireland, being one of the passages into Galway bay.

Gregoire, a town of Africa, in the country of Whidah; found 8. S. of Sabi.

Greewillier, a town of France, in the department of Mont Tomine; seven miles N. of Creutzmarch.

Greifenberg, a town of Lower Carinthia, on the Drave; 25 miles W. of Villaco.

Greifen, a lake of Switzerland, in the canton of Zurich, five miles E. of Zurich. It is about six miles long and a mile broad; on one side the shores are flat or gently rising, on the other side are hills richly wooded. The village of Greifen is agreeably situated on a small promontory, embrowned in a wood.

Greifenberg, a town of Silezia, in the principality of Jauer; 32 miles W. of Jauer. N. lat. 50° 51'. E. long. 15° 30'.—Allo, a town of Hinder Pomerania; 28 miles N. of Stargard. N. lat. 52° 51'; E. long. 15° 12'.

Greifenburg, a town of Germany, in the Ucker Mark of Brandenburg, on the Sprei; 45 miles N.N.E. of Berlin. N. lat. 53° 34'; E. long. 14° 3'.

Greifenhagen, a town of Hinder Pomerania; 37 miles N of Cultheim. N. lat. 53° 20'; E. long. 14° 36'.

Greifenstein, a town of Germany, in the province of Solms Brabant; seven miles N.N.W. of Braunfels. N. lat. 50° 51'; E. long. 8° 25'.

Greifswald, or Gipswald, a seaport town of Anterior Pomerania, on the river Rik, which is navigable to the Baltic. This town has an university founded in 1456. It was formerly one of the Hanseatic towns; 15 miles S.E. of Stralsund. N. lat. 54° 41'; E. long. 13° 23'.

Greifswalde Osee, a small island in the Baltic, off the mouth of the Oder, near the S.E. coast of the island of Uedem. N. lat. 54° 13'; E. long. 14° 3'.

Grein, a town of Austria, on the N. side of the Danube; 62 miles W. of Vienna. N. lat. 48° 16'; E. long. 14° 45'.—Mio, a town of the Arabian Iraq, on the Euphrates; 36 miles N of Sura.

Greitz, or Greitz, a town of Saxony, in the Vogtland, situated on a river which runs into the Elbe. In this town there are some stuff manufactues. It contains about 450 houses; 12 miles S.W. of Zwickau. N. lat. 50° 35'; E. long. 12° 10'.

Greensaker, a town of Sweden, in the province of Vastmanland; 48 miles W. of Stureholm.

Greewa. See Græwia.

Grenada, Lamba de, in Geography, a Spanish Dominican island, in the sixteenth century, was born in the year 1524. He was probably intended for a civil life, and educated with that view, but embracing the ecclesiastical profession, he acquired a high character for sanctity and virtue, and was chosen to fill the most honourable post of his order. He was held in much estimation by the kings of Portugal and Castile, and was made confessor to queen Catherine or Portugual, fitter to the emperor Charles V, who was desirous of appointing him to the archbishopric of Braga, an honour which he resolutely declined: he uniformly refused all the offers of ecclesiastical preferment, and devoted his days to the austerities of monastic discipline, and the composition of pious and devotional treatises. He died in the year 1583. His works are theological, consisting of "A Catechism," in four volumes; "A Treatise on Prayer," in two volumes; "Sermons," in the Latin language, in six volumes; and other pious and practical pieces. The greater part of them has been translated from the Spanish and Latin into French by father Girard, and published in two volumes folio, and eight volumes 8vo.

Grenada, in Geography, an island in the West Indies, about 20 miles in extent from north to south, and about 10 miles in mediad breadth; the extremes gradually contracting northward and southward, and particularly towards the S.W. corner. It was discovered by Christopher Columbus in the year 1498, who found it inhabited by a numerous and warlike people, called Caribees or Caribbees, among whom the Spaniards do not seem to have ever attempted to force a settlement. These original inhabitants remained happy and peaceful until the year 1650, when the avarice and ambition of a redheads individual devoted them to destruction. This person was Du Parquet, the French governor of Martinico, who putting himself at the head of upwards of 200 hardy ruffians, wantonly attacked and determined to dispossess the unoffending natives. This atrocity act was perpetrated under the mask of religion, and with a mixture of fanaticism and knavery which no human mind can contemplate without indignation and horror. Notwithstanding the injustice of this invasion, the commanders administered the holy sacrament, in the most solemn manner, to all the soldiers on their embarkation; and again on their landing, Du Parquet, causing a cross to be erected, compelled them to kneel down before it, and join in this most solemn prayer to Almighty God for success to their wicked enterprise. Checked, however, in the progress of this accursed business by some fragments of
conscience, after he had been hospitably entertained by the natives, he pretended to open a treaty with the chief of the Caribees for the purchase of the country. Accordingly he gave the natives "some knives and hatchets, and a large quantity of glass beads, besides two bottles of brandy for the chief himself," and thus, says Du Tertre, was the island fairly ceded to the French nation by the natives themselves in lawful purchase! And their future refinance was considered as contumacy and rebellion. Du Parquet, having established a colony in Grenada, and built a fort for its protection, committed the government of the island to a knishman, named Le Côme, who engaged in a cruel and bloody war with the Caribees, and being reinforced with 300 men from Martinique, he proceeded to establish and maintain his authority by massacres and murders, the relation of which makes even the reader to tremble. By a series of such enormities, the whole race of Caribees that possessed Grenada in 1650 was speedily exterminated; and the French, having destroyed all the natives, proceeded in the next place to massacre each other. Du Parquet, in the conduct and execution of those measures by which he had gained possession Grenada, had so far impaired his fortune, that in 1666 he was under the necessity of transferring it to Count de Cerillac for the sum of 50,000 crowns. This new proprietor appointed a governor, who, with tapical and ra-pacious disposition compelled the most respectable of the settlers to quit the country; and those who remained, assuming the administration of justice, brought the governor to a public trial, and ordered him for execution. Cerillac, deriving little advantage from his purchase, conveyed all his rights and interest in Grenada, &c., to the French West India company; whose charter being abolished in 1672, the island from that time became vellied in the crown of France. The island, as we may naturally suppose, was very imperfectly cultivated during the progress of these revolutions and calamities; and even so late as the year 1700, if Raynal has been rightly informed, it contained no more than 251 whites and 525 blacks, who were employed in three plantations of sugar, and 52 of indigo. By subsequent intercourse of a smuggling nature with the Dutch, the circumstances of the planters were somewhat improved, so much so that when, in the year 1762, the fortune of war made the English masters of this and the other Caribean islands, Grenada and the Grenadines are said to have yielded annually, in clayed and mucovado sugar, a quantity equal to about 11,000 hogheads of mucovado of 15 cwt. each, and about 27,500 lbs. of indigo. Grenada, having surrendered on capitulation in February 1762, was finally ceded, together with its dependencies, to Great Britain by the definitive treaty of peace at Paris on the 10th of February 1763. The chief stipulations of this treaty were as follow: 1st. That as they would become by their surrender subjects of Great Britain, they should enjoy their property and privileges, and pay taxes, in like manner as those of his majesty's subjects of the other British Leeward islands. 2dly. With respect to religion, they were put on the same footing as the inhabitants of Canada; i.e. liberty was given them to exercise it according to the rites of the Roman church, as far as the laws of Great Britain permitted. 3dly. Of such the inhabitants of Grenada as chose to quit the island, should have liberty to do, and 18 months should be allowed them to dispose of their effects. The island and its dependencies being thus become a British colony, two proclamations were issued, and General Mclwike was appointed governor. The crown, conceiving itself entitled by the terms of the capitulation to the duty of 4/12 per cent. upon all produce exported from the newly ceded islands, ordered such duty to be levied in Grenada, in lieu of all customs and duties formerly paid to the French king. This order occasioned a great constitutional question, which after much agitation was referred to a solemn adjudication before the judges of the court of king's bench in England. The cause was elaborately argued in Westminster hall, and lord chief justice Mansfield, in 1774, pronounced judgment against the crown: and therefore the duty in question was abolished, not only in Grenada, but also in the ceded islands of Dominica, St. Vincent, and Tobago.

The first assembly of Grenada met in 1765; and in 1768 the governor received instructions from the crown to admit two of the Roman Catholic inhabitants into the council, and to declare others to be eligible into the assembly on taking the oaths of allegiance and supremacy. These instructions, and the measures which followed them, were productive of great commotions and party divisions in the colony. The king, however, refused to revoke his instructions; upon which the most zealous of the Protestant members of the assembly declined attendance, so that it was but seldom that a house could be formed. In this state of faction and perplexity the island continued until its recapture by the French under the count d'Eslang, in 1779. By the general pacification which took place in January 1783, Grenada and the Grenadines were restored to Great Britain.

Grenada contains about 80,000 acres of land; of which the quantity actually cultivated has never exceeded 50,000 acres. The face of the country is mountainous, but not inaccessible in any part, and it abounds with springs and rivulets. To the north and the east the soil is a brick mould; on the west side it is a rich black mould on a sub-stratum of yellow clay. To the south the land is in general poor, and of a reddish hue, which extends over a considerable part of the interior country. On the whole, however, Grenada appears to be in a high degree fertile, and by the variety, as well as excellence of its returns, seems adapted to every tropical production. The exports of the year 1776, from Grenada and its dependencies, were 14,012,157 pounds of mucovado, and 927,607 pounds of clayed sugar; 818,700 gallons of rum; 1,827,166 pounds of coffee; 457,195 pounds of cacao; 91,643 pounds of cotton; 27,635 pounds of indigo, and some smaller articles: the whole of which, on a moderate computation, could not be worth less, at the ports of shipping, than 600,000 sterling, excluding freight, duties, insurance, and other charges. The sugar was the produce of 106 plantations, wrought by 18,293 negroes, which is rather more than one hoghead of mucovado sugar, of 16 cwt. from the labour of each negro; a return, says Mr. B. Edwards, equalled by no other British island in the West Indies, St. Christopher's excepted. The exports of 1787 were 175,548 cwt. 9 lbs. of sugar; 670,900 gallons of rum; 4,350 gallons of molasses; 8,512 cwt. 2 qrs. 4 lbs. of coffee; 271,716 cwt. 3 qrs. 18 lbs. of cacao; 2,562,437 lbs. of cotton; 2,810 lbs. of indigo, and miscellaneous articles; such as hides, dyers' woad, &c., to the amount in value of 645,454l. 9s. 9d.; and the total value of all, according to the current prices in London, 641,668l. 9s. 3d.

This island is divided into five parishes, viz., St. George, St. David, St. Andrew, St. Patrick, St. Mark, and St. John; and its chief dependence, Caracou, forms a seventh parish. Since the restoration of Grenada to Great Britain in 1783, an island law has been obtained for the establishment of a Protestant clergy. This act, which passed in 1784, provided stipends of 332l. currency, and 60l. for house-rent per annum, for five clergymen, viz. one for the town and
and parish of St. George, three for the other five out-parishes of Grenada, and one for Caricaou. Besides these stipends, there are valuable glebe lands formerly appropriated to the Roman Catholic clergy, when that was the established religion of Grenada, which became vested in his majesty as public lands on the restoration of the island to the British government, and which, it is said, have been applied by the colonial legislature, with the consent of the crown, to the further support of the Protestant church, with some reference for the tolerated Romish clergy. The capital of Grenada, soon after the cession of the country to Great Britain by the peace of Paris, is called St. George, which fee. The other towns in Grenada are, properly speaking, inconsiderable villages or hamlets, which are generally situated at the bays or shipping places in the several out-parishes. The parish town of Caricaou is called Hillsborough. Grenada has two ports of entry, with separate establishments, and distinct revenue officers, independent of each other; one at St. George, and one at Grenville bay, a town and harbour on the east, or windward side of the island. The whole population of Grenada and the Grenadiers has decreased considerably since these islands first came into possession of the English. In the year 1771, the number of white inhabitants was somewhat more than 1000; in 1777, they had decreased to 1300, and at a later period they were supposed not to exceed 1000, of which about two-thirds are men able to bear arms, and incorporated into five regiments of militia, including a company of free blacks or mulattoes attached to each. There are likewise about 500 regular troops from Great Britain, which are supported on the British establishment. Besides the regular troops sent from Great Britain for the protection of Grenada, there are in its garrison three companies of king's negroes, which came from America, where they served in three capacities, as pioneers, artificers, and light dragoons. In Grenada they form a company of each, and are commanded by a lieutenant of the regulars, having the rank of captain. The negro slaves have also decreased. In 1779 they were flattered at 35,000, of which 5000 were in Caricaou and the smaller islands. In 1785 they amounted to no more than 25,000 in the whole. The free people of colour amounted in 1787 to 11,455. To prevent the too great increase of persons of this class, every manufactory is, by an act of the island, charged with a tax of ten per cent. currency, payable into the public treasury. The evidence of these people, whether born free or manumitted, is received in the courts of this island, on producing proof of their freedom; and they are tried on criminal charges in the same manner as whites. They are also allowed to possess and enjoy lands to any amount, provided they are native-born subjects or caputitants, and not aliens. The governor is, by virtue of his office, chancellor, ordinary, and vice-admiral; and presides solely in the courts of chancery and ordinary, as in Jamaica. His salary is 3200l. currency per annum, which is raised by a poll-tax on all slaves; but in all cases of absence beyond twelve months, the salary ceases and determines. N.B. The currency of Grenada, or rate of exchange, is commonly 6s. 8d. per cent. work silver. The council of Grenada consists of 12 members, and the assembly of 26. A freehold, or life-estate of 50 acres, is a qualification to fit as representative for the parishes, and a freehold or life-estate, in 50l. house-rent in St. George, qualifies a representative for the town. An estate of ten acres in fee, or for life, or a rent of 10l. in any of the out-towns, gives a vote for the representatives of each parish respectively; and a rent of 25l. per annum, arising out of any freehold or life-estate in the town of St. George, gives a vote for a representative of the town. The laws courts in Grenada, besides those of chancery and ordinary are the court of grand-jury of the peace held twice a year, viz., in March and September; the court of common-pleas, consisting of one chief and four assistant judges, whose commissions are during pleasure, the chief justice being usually appointed in England, with a salary of 600l. per annum, and the others being commonly appointed by the governor without any salary; the court of exchequer, lately grown into a diocese; the court of admiralty for the trial of all prize-causes of capture from enemies in war, and of revenue-seizures in peace or war, having one judge of admiralty and one surrogae; and a court of error, composed of the governor and council, for trying all appeals of error from the court of common-pleas. The common and statute-laws of England are considered as extending to Grenada in all applicable cases, not provided for by the laws of the island. N. lat. 10° 17' W. long. 61° 50'. Edwards's Hist. of the West Indies, vol. i.

GRENADE, or GRENADA. See GRANADA.

GRENADE. See GRANADO.

GRENADE, a town of France, in the department of the Landes, and chief place of a canton, in the district of Mont-de-Marin; seven miles E. of St. Saviour. The place contains 1530, and the canton 7563 inhabitants, on a territory of 195 square miles, in eleven communes. — Also, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the district of Toulouse; 12 miles N. N. W. of Toulouse. The place contains 3500, and the canton 9142 inhabitants, on a territory of 232 square miles, in 13 communes.

GRENADIER. See GRANADIER.

GRENADIER, in Ornithology. See LOMA ORIX.

GRENADIN. See FRAGILLA GRANATINA.

GRENADINES, or GRENADILAS, in Geography, a cluster of islands in the West Indies, amounting in number to more than 20, situated between Grenada and St. Vincent, and producing cotton, coffee, indigo, and canes. Caricaou is the principal. These islands formerly appertained to the government of Grenada; but by an arrangement of the British administration, a line of demarcation in an east and west direction, between Caricaou and Grenada, is the term of these, and some smaller islands farther west, are all that are now comprised in the Grenada government: Union Island, with all the little islands adjoining, to the north, being annexed to the government of St. Vincent. See CARICAOU and RONDE.

GRENAILLE, a name given by the French writers to a preparation of copper, which the Chinese use as a red colour in some of their most intact china, particularly for that colour which is called ulered, or red in oil. The china-ware coloured with this is very dear. The manner in which they procure the preparation is thus: they have in China no such thing as silver-coined money, but they use in commerce bars or mests of silver; these they pay and receive in large bargains; and among a nation so fully of fraud as the Chinese, it is no wonder that these are often adulterated with too great an alloy of copper. They pay, however, in this state in the common payments. There are some occasions, however, such as the paying of the taxes and contributions, on which they must have their silver pure and fine; on such occasions they have recourse to certain people, whose how much it is to refine the silver, and separate it from the copper and the lead it contains. Thus they do in furnaces made for the purpose, and with very convenient vessels. While the copper is in fusion, they take a small brush, and dip the end of it into water; then striking the handle of the brush, they sprinkle the water by degrees upon
upon the melted copper; a fort of pellicle forms itself by this means on the surface of the matter, which they take off while hot with pincers of iron, and immediately throwing it into a large vessel of cold water, it forms that red powder, which is called the grenaille; they repeat the operation every time they in this manner separate the copper; and this furnishes them with as much of the grenaille as they have occasion for in their china works. Observations for les Costumes de l'Afrie, p. 359.

Grenahen, in Geography, a town of Switzerland, in the Valais; 25 miles E. of Sion.

Grenat, in Ornithology. See Trochilus auratus.

Grenier, in Geography, mountains of Hindooftan, in the country of Guzerat, near Junagur.

Grenna, a town of Sweden, in the province of Smaland; 10 miles N.N.E. of Jonkoping.

Grenoble, an ancient, large, and well-built city of France, and capital of the department of Isère, situated in a marshy but fruitful plain, at the foot of a hill, near the confluent of the river Isère. Before the revolution it was the capital of Dauphiny, the see of a bishop, and the seat of a parliament. It was the scene of many cruelties in the religious wars, A.D. 1562. It is divided by the river Isère into two unequal parts, the largest of which is regularly built. Its manufactures are cloths, hats, gloves, &c. The number of its inhabitants is 23,5000 in 3 cantons, on a territory of 265 kilometres, in 26 communes. To the north are the ruins of a chateau, an eminence, which commands an agreeable prospect of the town, the banks of the Isère, and several fertile valleys. In a rugged valley, watered by the rapid Drac, about 5 leagues S. of Grenoble, are the mineral springs of La Motte, highly esteemed as a remedy for fluxes and all disorders of the stomach, but little used on account of the difficult access to them. Four leagues N. of Grenoble is Le Grand Chartreusse, a famous Carthusian monastery, founded A.D. 1086, consisting of an excellent library, and many apartments, on an eminence enrobed by rugged precipices of difficult access. N. lat. 45° 11' 59'. E. long. 5° 43' 16'.

Grenouilles, I.e.s, a cluster of rocks in the West Indian ocean, about 36 miles S.E. from Point Morand, in the island of Jamaica. N. lat. 17° 32', E. long. 76° 32'.

Grenville, a town of Nova Scotia. See Granville.

Grenville, a county in Upper Canada, bounded on the E. by the county of Dundas, on the S. by the river St. Lawrence, and on the W. by the township of Elizabeth town, running N. 24° W. till it intersects the Ottawa or Grawal river, and thence defending that river until it meets the north and westermmost boundary of the county of Dundas. This county comprehends all the lands near to it in the river St. Lawrence.

Grenville's Canal, a channel of the N. Pacific ocean, which separates Pat's Archipelago from the coast of New Cornwall.

Grenzhausen, a town of Germany, in the county of Wied; 3 miles N.E. of Cochem.

Grenpoin, a town of Switzerland, in the canton of Lucerne; 5 miles E. of Lucerne.

Gres, Cape A1, a promontory on the E. side of the Milipluppi, in the N.W. territory, 3 leagues above the Illinois river, and the tract of country so called extends 5 leagues up that river.

Gresham, Sir Thomas, in Biography, an eminent London merchant, son of Sir Richard Gresham, who was raised to the high office of lord mayor of the city of London, was born in 1510. He received an academical education at Cambridge, but being designed to follow the commercial business of the family, he was bound apprentice to his uncle Sir John Gresham, and thus became a member of the Mercers' company. His father was agent of the king's money concerns at Antwerp, and Thomas expected to be his successor in this business, but the preference was given to another person, by whose mismanagement they were brought into a deplorable condition. Rose and was now paid to the subject of this article, who was hout over in 1532 by the regency in the minority of Edward VI., in order to retrieve them. In this affair he exerted so much talent, that in two years he was able to pay off the whole of a loan bearing enormous interest, and raised the king's credit to the most respectable rank. At the accession of Elizabeth, he was for a time deprived of his office, but it was restored to him again, and he continued in it as long as he lived. He also received at the hands of his sovereign the honour of knighthood. He transmitted many important pecuniary negotiations of that long and glorious reign, and was a most spirited promoter of the infant manufactures of the kingdom, those of small wares in particular being established chiefly through his means. His own property, derived by inheritance, with that acquired by his industry and talents, made him the richest subject in the metropolis, and he made use of his wealth to noble and extensively benevolical purposes. In 1564 he had the misfortune to lose his only son, and he fell upon the moans of diverting his grief on this melancholy occasion by public undertakings. The first design of building an exchange for merchants, in imitation of that of Antwerp, was entertained by his father. Sir Thomas carried the plan into effect, and completed the noble building in three years. (See Royal Exchange.) When the troubles in the Low Countries interrupted the accustomed loans to the crown from Antwerp, Sir Thomas advised the minister to apply to the merchants of his own country, and this may be considered as the commencement of the immense advances since made to the crown from the same body. Sir Thomas Gresham next determined to hew a part of his wealth in founding a college for the sciences in his native city. The principal people in the university of Cambridge endeavoured to diffuse him from thus establishing a rival institution; but his determination was fixed. He devised by will his house in Bishopsgate-street for the purpose of being converted into habitations and lecture-rooms for seven professors, or lecturers on the seven liberal sciences, who were each of them to receive a salary out of the revenues of the Royal Exchange. These lectures are still given in apartments in the Royal Exchange, whenever there are a sufficient number of auditors assembled to call for the exertions of the lecturer. The subjects of the lectures are divinity, logic, physics, grammar, geometry, music, and rhetoric. Sir Thomas endowed many public charities. He died suddenly in his own house in the year 1579, and was buried in a sumptuous manner in the church of St. Helen, Bishopsgate-street. He had expended large sums of money in erecting corn, oil, and paper-mills upon the stream of the Brent, near his favourite villa at Ottery-park. Biog. Brit.

Gresham College. See College.

Gresholm, in Geography, a small island of Denmark, in the Categat; 4 miles N.E. of Lufsoe.

Gresi, a town of Turkish Armenia; 28 miles S.E. of Rizh.

Gresley's Canal, an inland navigation in Staffordshire, near Newcastle-under-Lyme, made in pursuance of an act of 15 Geo. III. To the account given in our article CanaL
Canal we have here only to add, that in 1805 the Nantwich and Newcastle rail-way was proposed, to connect with this canal, at Dale's pool.

Gresling, in Ichthyology, a name given by the Germans to the gobius fluviatilis, or common gudgeon, which is very frequent in their smaller rivers.

Gresnich, in Biography, a modern German composer of the Italian school, who has composed several successful operas in Italy, and whose capital bravura airs were frequently sung in England by madame Mara, for whose abilities of execution we believe they were originally composed.

Gressen, in Geography, a town of Samogitia; 20 miles N.N.E. of Meshnik.

Gresset, John Baptist Lewis, in Biography, born at Amiens in the year 1709, was educated among the Jansenists, and from this retreat he sent forth some poems, which pleased all the taste and delicate pleasantry that could have been looked for from the pen of a man of the world. These were entitled "Ver Vert," a very pleasing tale; his epistles of "La Chartreufe," "Les Ombres," and many others. His reputation as a poet was the cause of his quitting the society, and fixing his residence in the metropolis. He now tried his powers in dramatic composition; in tragedy he had very little success, but his comedies were better received; and that entitled "Mechant," represented in 1747, raised him to the first rank of writers in this class. It was regarded as a masterpiece in that species of comedy which paints manners with truth and force, without being highly comic. Gresset was admitted a member of the French academy in the year 1748. He grew weary of a literary life, leaned to doubt of the propriety of theatrical exhibitions, and soon after announced the stage, by a letter, in which he displayed the dangers attending public spectacles. He returned to Amiens, where he obtained a post under government, married a lady with a good fortune, and passed the remainder of his life in a manner which required him the esteem and respect of his fellow citizens. In 1775 he revisited the metropolis, and had the honour, as director of the French academy, to compliment Lewis XVI. and his queen on their accession to the throne. His discourse on this occasion, which was printed, was a severe satire on the vices and follies of the metropolis. He died in June 1777, having received, some time previously to this, letters of nobility, and having been likewise appointed historiographer of the order of St. Lazare. Gresset is placed between Chauveau and Voltaire for the grace of light poetry; he is perhaps the first at the theatre for elegance of versification in comedy, and his morals were as pure as his style. Gen. Dig.

Gressin, in Geography, a town of Hinder Pomerania; 14 miles S.E. of Belgard.

Gresten, a town of Austria; 9 miles N.E. of Bavaria Waithaven.

Gretna, a village of Scotland, in the shire of Dumfries, 8 miles from Carlisle, and 82 from Edinburgh, at the S.E. extremity of the county, near the W. bank of the Sark, and bottom of Solway forth; famous for the clandestine marriage of parties from England, celebrated by persons who have no right to marry, or to exercise any part of the clerical function; because it is out of the jurisdiction of the marriage act.